SPECIAL REPORT: TWO HOT NEW MACINTOSHES!

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MAR./APR. 1987
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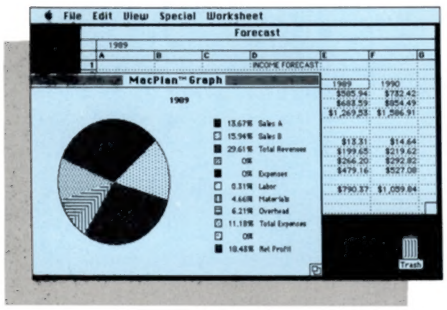

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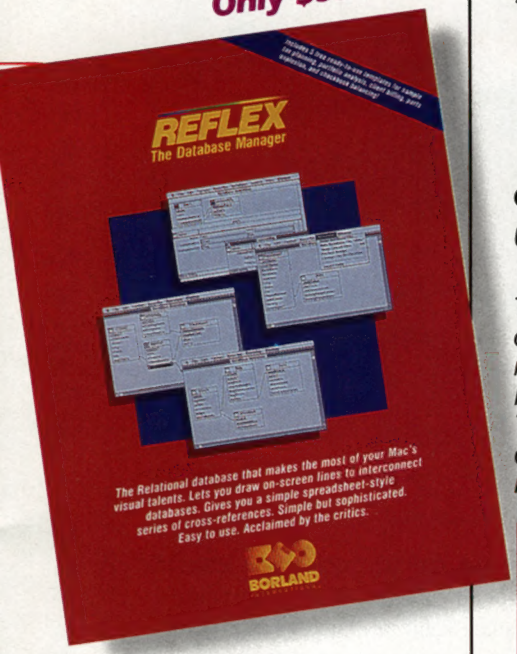
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Robert Forras, MacTimes

Turbo Pascal is already an industry standard in the IBM-compatible world and we're very excited to see Borland International's new commitment to provide this and other modestly-priced, high-quality software for the Macintosh computer.

John Sculley, Apple Computer, Inc."

System requirements:
Macintosh 512K or Macintosh Plus with one disk drive. (The complete Turbo Pascal package, including compiler and editor, occupies only 50K of memory.)

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Special Report

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by David Szetela

The Macintosh just keeps getting better. Big screens, color capability and expandability make the new generation of Macs the most important innovation in personal computers today.

Art for Feature Article by Richard Cowdrey Inspired by February 13, 1960 *Saturday Evening Post* cover by Norman Rockwell. Used by permission, Curtis Publishing Co. © 1987.

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RAW DATA

by Ric Ford

January Expo

The January MacWorld Expo in San Francisco introduced some interesting products, although not all were ready for sale.

Stepping Out, a program from Berkeley System Design, gives you a Radius-style, full-screen display on a regular Macintosh. When you move the mouse to the edge of the Mac screen, it automatically scrolls to let you see more of the enlarged "virtual" screen created by Stepping Out.

Adobe introduced Illustrator, an advanced program for professional artists and designers. Illustrator could signal the start of a new generation of applications — with far more drawing capabilities than MacDraw/MacPaint-type programs.

Scanner companies are starting to support Aldus' new standard for scanned graphics, TIFF (Tag Image File Format), and that should be an important consideration for buyers. Look for OCR (Optical Character Recognition) in 1987 from these companies (although hiring a typist is often more cost effective than OCR input).

Programming

Consulair and TML are both working on cross-development systems that allow you to write Apple IIGS programs on the more powerful Macintosh. Consulair has the MactoGS Assembler/Linker, and TML is developing a Pascal cross-compiler.

Smethers Barnes' Prototyper application will be one to watch — it's supposed to let you create a prototype of a Macintosh application without doing any programming.

Another interesting program is Mainstay's VIP (Visual Interactive Programming). It lets you create programs by selecting and connecting flowchart-type symbols with the mouse and just filling in the blanks for Macintosh Toolbox calls.

Networking

There's a lot of action in the networking area. Farallon is working on advanced network management hardware and software for AppleTalk and PhoneNet. PhoneNet is being used successfully in a wide variety of businesses; it seems to be quite a bit more flexible than AppleTalk, and it's AppleTalk-compatible.

Keep an eye on Internet, a company developing electronic mail, network bridges, and other applications for AppleTalk. Kinetics, meanwhile, has just introduced EtherSC, a box for connecting the Mac Plus SCSI port to Ethernet ($1,250). Kinetics' FastPath box is the standard for bridging between AppleTalk and Ethernet networks. Sun has just signed a letter of intent to acquire Centram and their TOPS networking software.

Rumors...

Neither Lotus nor Micah showed at the January expo....The dBase-compatible dMac III database manager has been bought out by Nantucket and renamed McMax....Remote Helix isn't due out until the end of 1987....Personal Computer Peripherals Corp. has an optional Hayes-compatible modem that goes inside their MacBottom disk drives....Both More and Acta have been upgraded; the upgrades are free to registered owners....Infosphere is working on a modem server that will let a number of people connected to one AppleTalk network all share a modem....RAM upgrades using 1Mbit chips are starting to become available for the Mac Plus — memory can be increased to 2.5 or 4 MB with no additional power drain or heat buildup.

THE NEW MACS!
Foundation for the Future

After months of speculation, the Macintosh SE (System Enhanced) and the Macintosh II are now realities. Elsewhere in this issue, we explore the specifications and performance significance of the new systems — and they're impressive by any standard. To summarize:

- Both systems use a new 32-bit processor (like big mainframes) that gives them on-board memory capacity of 4 megabytes and 8 megabytes, respectively.
- The Macintosh II doubles the processor speed over other members of the Mac family.
- The Macintosh SE and the Macintosh II have one and six expansion slots, respectively.
- The Macintosh II can be augmented by add-ons like:
  Color video card
  20, 40 and 80 megabyte SCSI disk drives
  High resolution monochrome monitor
  High resolution color monitor
  Magnetic tape backup system

It's useful to think of the Macintosh SE as an expandable Mac Plus that upgrades the processor and memory capacity of the system. It is also an important link between the existing Mac family and the new Macintosh II. The big story, however, is the Macintosh II.

WHAT'S IN A NAME?

For those of us who have been in this business for a while, there is a symbolic (and real) significance in the selection of **Macintosh II** as the name for the new system. The link to the **Apple II** name is subtle. We think it represents a new foundation system which is the **beginning of a new family rather than the top-of-the-line of the current family.**

SLOTS

One system characteristic, more than any other, has allowed the Apple II to grow, evolve, and survive longer than any other personal computer: the *slots*. Slots are the receptacles inside the box that allow special-function printed circuit boards to be plugged into the system.

Over the years, the creativity of independent developers has made awesome use of those slots in the Apple II family. With slots, the Apple II has been enhanced with expanded memory, hard disk options, networking cards, graphics cards, and a huge array of peripheral interfaces.

The implications of the new slot architecture for the Macintosh II are staggering:

- Apple's new color video card gives 16-256 colors and opens dramatic new possibilities for graphics and highlighted business applications.
- Fiber optics networking allows hundreds of systems to be interconnected over a mile apart.
- High-speed printers and interfaces will give the Mac serious, high-volume data/transaction processing capacity.
- The price/performance of disk storage will continue to improve, and we'll see massive on-line databases built around the Mac.
- The processing power of the Mac, augmented by new floating point and memory management coprocessors, may start a data processing revolution that moves the computing power away from the mainframes and onto corporate desktops.

In short, we are surrounded by new technologies that have needed an "engine" around which to cluster. The engine is here. Moreover, the vast, existing array of high-performance peripheral technologies now become candidates for interfacing with the new Macintosh systems.

The Macintosh II can technically handle up to *two* gigabytes of memory that could be added in the slots. The combination of slots and big system addressing begins to put the Macintosh II into the big system arena.

SORTING IT OUT

We frequently receive letters from our readers expressing frustration with the dizzying array of products and nomenclature that describes them. At this writing, here's how it all fits together:

- The 512K (enhanced) Mac continues as the affordable entry-level system.
- The Mac Plus continues as a more powerful version of the 512K system.
- The Mac SE links the Mac Plus capability to the new architecture (and we suspect it will eventually supersede the Mac Plus).
- The Mac II is the base-line architecture of the new Macintosh family with formidable growth potential.

The compatibility features of the new systems produce a high level of software compatibility throughout the family. This ensures that current Mac users will be able to transport their applications and data files into the new architecture as transaction/processing growth demands it.

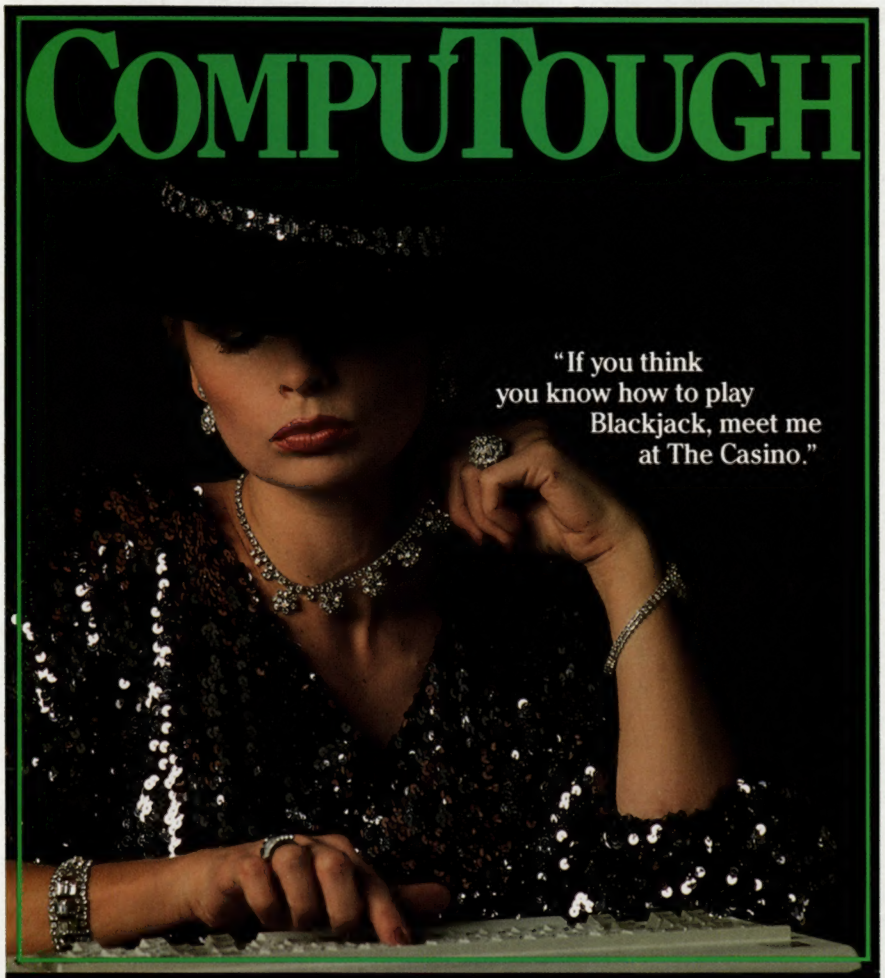
IMPLICATIONS FOR THE FUTURE

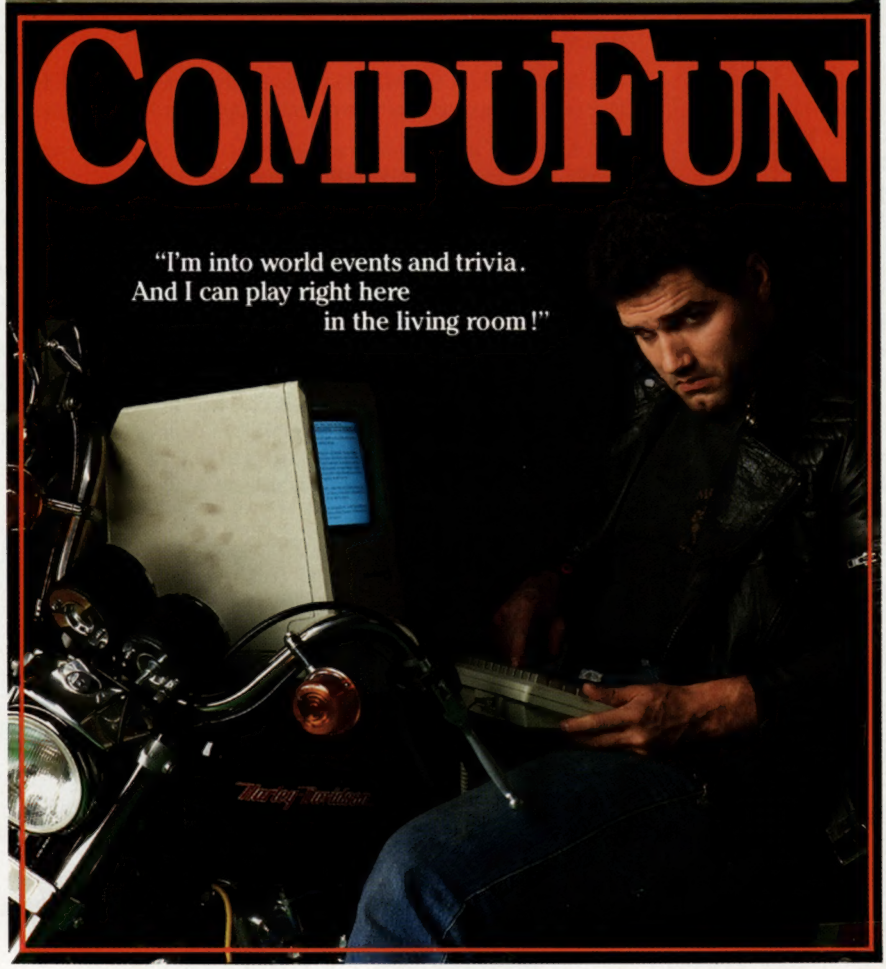
Architecturally, the Macintosh II sets the stage for a new generation of applications and systems capability. It defines an architectural engine that will allow evolutionary growth for years to come. It may turn out to be Apple's most significant announcement since the Apple II.

We're excited to present two new Nibble Mac features. **Raw Data** is our late-breaking Mac industry news column, penned by industry veteran Ric Ford, publisher of MacInTouch. And you'll also find our new **Program Listings Section**; we hope you'll appreciate the convenience of having all of the listings for each issue in one spot. Let us know how you like the new additions!

Mike Harvey

Mike Harvey
Publisher





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A Welcome to New Readers

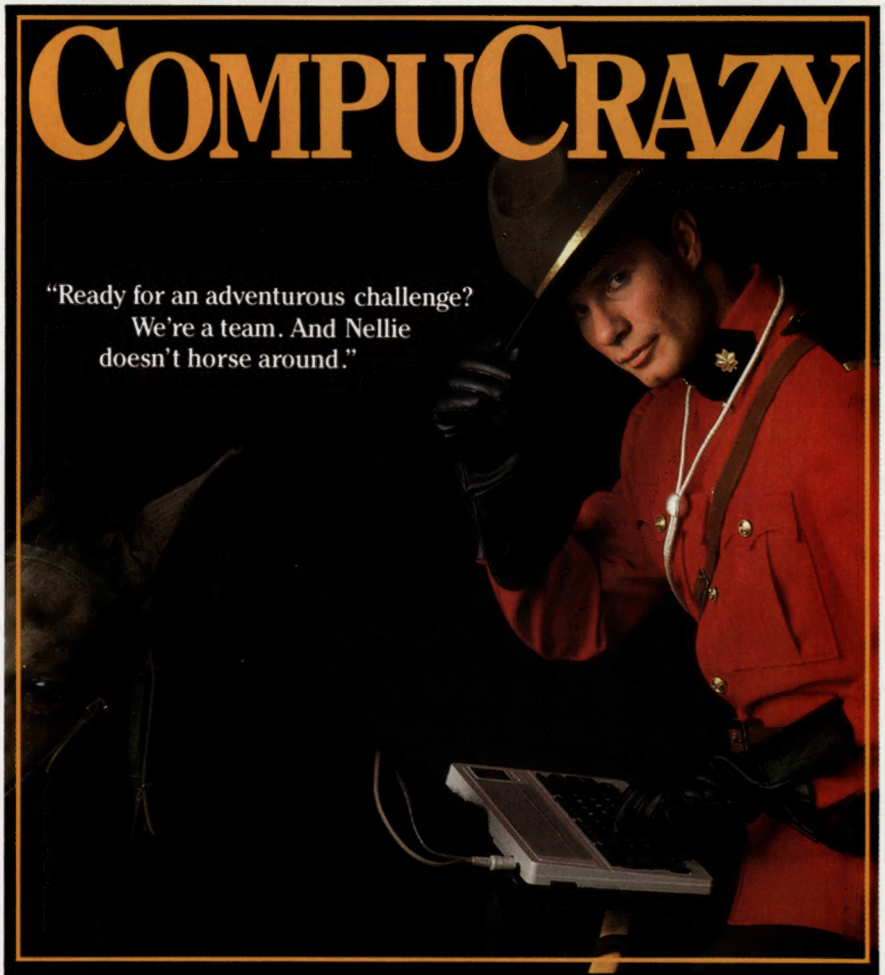
Welcome to *Nibble Mac*, the Magazine for Macintosh Enthusiasts. In each issue of *Nibble Mac*, you'll find a wealth of things to do with your Mac. You'll find programs that are complete, debugged, and ready for you to type in and use. You'll also find reviews of the latest in Macintosh software and hardware that will help you make those difficult buying decisions. Our Raw Data column will bring you up-to-date with the latest news and rumors from the Macintosh community. And you'll find "how to" articles in our Working Smarter section that will help you make better use of the software that you already own, like Excel and Microsoft Works.

Nibble Mac presents several high quality, ready-to-type Macintosh programs in each issue. Each program is accompanied by an article that begins by fully describing the use of the program. It then gives complete directions for typing in and saving the program on disk. If you want software you can use, those two sections have all you'll need. Just read the general directions for typing programs at the beginning of the Program Listings Section and you're off! You don't need to understand the programming techniques to use the programs. And if you'd rather not type in the programs, most are available on disk (see the Software Catalog near the back of the magazine for details).

For those who want to tinker or to learn more about programming, each article includes a section on how the program works and how it can be modified. If you're new to programming, you may want to save these sections for later, or just scan them briefly.

As a *Nibble Mac* reader, you're part of a community of Macintosh enthusiasts. Your voice is important in shaping *Nibble Mac*, and we hope we'll hear from you. Please write and let us know your thoughts.

Thank you,
The Editors



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LETTERS

Softstrip Plea

First, let me say that I love your magazine. It's full of programs that I find very useful. Keep up the excellent work.

However, I am disturbed by the Jan./Feb. 1987 issue. Of the seven software programs that you feature, only one includes a Cauzin Softstrip. Why can't you publish a Softstrip for each program? There are several programs in that issue that I could use besides MacCalendar.

Please do us Cauzin users a favor and print Softstrips whenever possible.

Steven R. Haskell
Livonia, MI

We can understand your irritation with our decision to limit the number of Cauzin strips in *Nibble Mac* — at least for the time being. As you may know, we were at the forefront of support for the strip technology when we began publishing strips for every program early last year. Our hope was that our investment of time and money in the strips would help to advance the technology. We believe that over the long term, strip technology will become a significant medium for the communication and transfer of programs and data.

Hindsight has 20/20 vision. Looking back a year, we should probably have moved more slowly than we did. We should have started out publishing strips for the major feature (as other magazines have **begun** to do recently). We believed so strongly in the technology that we jumped in with both feet. Late last year, it became apparent that fewer than 10 percent of our readers had purchased strip readers.

As one of the last independent publishers of Apple magazines, we must be particularly sensitive to the needs of the majority of our readers. The painful reality is that broad acceptance of the strip technology is taking longer than we anticipated (and hoped for) a year ago. Further evidence of this is that Cauzin has shifted its 1987 marketing strategy, increasing its emphasis on industrial applications of the strip reader.

At the same time, we did not and do not want to leave strip reader owners out on a limb. Our perspective on the situation is:

- **We are by no means abandoning the strip technology. We believe that our present coverage of strip technology still provides more value than any other magazine.**
- **Publishing strips for the major feature in each issue covers the largest volume of program code in strip form. The secondary programs in each issue take far less time to type and run.**
- **The strips for secondary programs are still available for a nominal fee ($3.00) that just covers our cost.**

Most of our readers find that a significant value of the programs and the listings is in learning how they work and in applying those techniques to their own programming efforts. If that were not the case, we could just publish strips (and even omit the BASIC program listings). But we're trying to fulfill multiple needs of our readers, i.e., providing worthwhile programs for personal use and providing a medium for learning more about the Macintosh and how to use it.

In the months to come, we will continue to survey our readers and track the acceptance of strip technology, and we will definitely scale up coverage of the strips as acceptance of this technology grows. In addition, for features that do not lend themselves to a straightforward type-and-run approach, we will seriously consider publishing them in strip form. This would involve features such as specialized utilities, clip art, indexes, etc.

To summarize, we believe that strip technology is important and that its acceptance will grow. We are simply recognizing that market acceptance of new technology proceeds at its own pace. We intend to keep pace with the technology as it grows.—*Ed.*

BASICally Speaking

I was taught that for speed of operation, frequently used Applesoft BASIC routines should be located toward the beginning of the program and infrequently used ones should be located toward the end. In addition, several commands should be stacked in a single line, rather than placed in separate lines. Several different "crunch" programs are available that will strip REM statements from Applesoft programs and will place as many commands as logically possible on each line.

Does subroutine location make any difference in Microsoft (MS) BASIC, or is the program management totally different than Applesoft? Clarity is enhanced in MS BASIC by listing each command on a sepa-

continued on page 67

SPECIAL REPORT

by David Szetela

MACINTOSH: THE SECOND GENERATION

Bigger, faster, more flexible, more powerful Macintoshes are on the way! Here's the inside scoop on the new machines.

The announcement of the two new Macs — the Macintosh SE and the Macintosh II — is bound to create the most excitement the PC industry's seen since the unveiling of the Apple IIGS last September. Leave it to Apple to advance the state of the PC art on two different fronts within the space of six months!

THE MACINTOSH II

The Macintosh II is the long-awaited Open Mac (promised by Jean-Louis Gassee's license plate), code-named Paris and Cabernet during various stages of its development. Though its most prominent features are the six NuBus slots and dazzling color capabilities, the Mac II is laden with advanced features that make it the most powerful under-$5,000 PC available (see **Table 1**).

The Mac II's CPU, a 68020 running at a blazing 15.7 megahertz (MHz), is a true 32-bit engine capable of directly addressing a mammoth amount of RAM. The entry-level machine comes with one megabyte (MB) of RAM, which is upgradable to 8MB. But when the one megabit chips become more widely available (and more reasonably priced), the motherboard RAM will be expandable to 128MB. And theoretically, the NuBus slots can hold memory cards that boost the RAM capacity to an unimaginable two gigabytes! That's enough room to hold the data stored on ten 20MB hard disks.

The color display capabilities are awesome, rivaling the quality that's available only on image processing equipment costing at least $50,000. At a sneak preview last year, I witnessed the Mac II displaying near-photographic-quality color images that could be moved and manipulated with the ease and speed of MacPaint.

And there is a host of other significant features. The new Apple Sound Chip (ASC) is capable of excellent four-voice wave table synthesis, but can play back digitized sound with lifelike clarity. The potential for developments in this area is astounding; with up to two gigabytes of RAM and a CPU running at 16 MHz, you can pack in an awful lot of wave table and digitized sound information, and pipe it through the ASC at top speed.

THE MAC SE

If you've been following the rumors that have been building over the past months, you may be surprised to learn that the Mac II isn't the only new game in town. Apple's security has been a little more tight about the Macintosh SE, presumably to avoid impact on Mac Plus and 512Ke sales before the SE's introduction.

On the surface, the Mac SE (for System Expansion) seems to have few advantages over the Mac Plus. But the extra price you pay for the SE buys expandability and the promise of compatibility with a new generation of Apple-installed and third-party upgrades.

Let's start with the slot. The SE sports an internal connector to the CPU bus; it's not the same as the NuBus slots in the Mac II. What can we expect to see plugged into the SE slot? For starters, we'll see MS DOS compatibility devices, accelerator boards, modems, large screen displays and memory upgrades.

Another significant improvement is Apple's standardization on the ADB (Apple Desktop Bus) keyboard on both the Mac II and the Mac SE. The mouse will be attachable to either the back of the Mac or to the keyboard (relax, lefties — there's a connector on the right and left sides). The ADB will let third-party developers create new input devices, like track balls and graphics tablets, that can be daisy-chained between the Mac and the keyboard. Apple's priming the pump by offering an optional keyboard for both new Macs that approximates the IBM keyboard, replete with function keys.

continued on next page

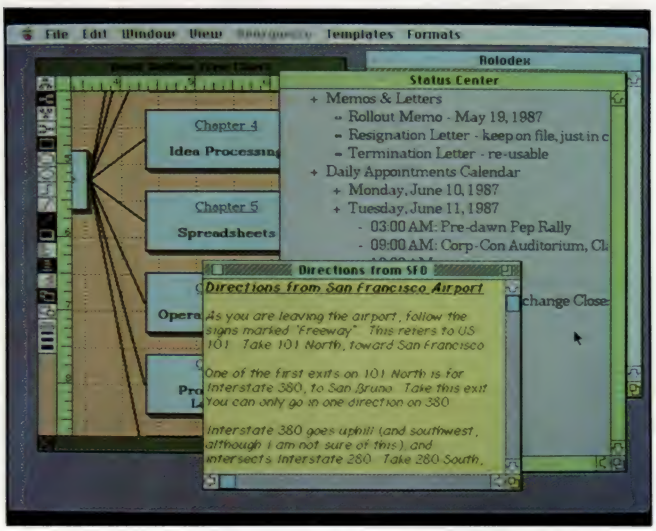
TABLE 1: Comparison of the Macintosh Plus, SE, and II			
Product:	**Macintosh Plus**	**Macintosh SE**	**Macintosh II**
Processor:	68000	68000	68020
RAM:	1MB expandable to 4MB	1MB expandable to 4MB	1MB expandable to 8MB (128MB when available); expandable to 2GB in NuBus slots
ROM:	128K	256K	256; optional 512K
Addressing:	24 bit	24 bit	24/32 bit
Clock:	7.8 MHz	7.8 MHz	15.7 MHz
Coprocessor:	None	None	68881 FPU
Video Display:	Built-in 9″; 512 × 342 B/W	Built-in 9″; 512 × 342 B/W	External monitor; video circuitry on NuBus card; optional 12″ analog monochrome, 640 × 480; optional 13″ analog RGB color, 640 × 480
Floppy Disk:	1 800K internal; optional 400K or 800K external	1 or 2 800K internal; optional 800K external	1 or 2 800K internal; optional 800K external
Hard Disk:	Optional 20MB SCSI external	Optional 20MB SCSI internal; optional 20MB SCSI external	Optional 20, 40 or 80MB SCSI internal; optional 20MB SCSI external
Slots:	None	One System Expansion connector to the CPU bus	Six NuBus internal slots supporting 32-bit address and data lines
Sound:	Mac four-voice sound	Mac four-voice sound	Apple custom digital sound chip (ASC), including wave table synthesis and stereo capability
Keyboard:	Macintosh Plus keyboard	Options: 81-key ADB keyboard with numeric keypad; 105-key ADB keyboard with numeric keypad, 15 function keys and T cursor pad	Options: 81-key ADB keyboard with numeric keypad; 105-key ADB keyboard with numeric keypad, 15 function keys and T cursor pad

HOW MUCH AND HOW SOON?

The SE will retail for $2,595; an internal hard disk can bring that price up to $3,595. The Mac II will start at $4,295 for a monochrome system with one internal 3.5-inch disk drive. A color system with a hard disk drive will bring the price up to $5,000-$6,000, depending on the size of the hard disk. Prices for the 512Ke and Plus, Apple says, will not change.

The Mac SE will be available on March 2. But if you're hot on the Mac II, you'll have to wait a few months; manufacturing starts in April, and the machine will be available "in limited supply" through June.

FIGURE 1: MORE In Color


File Edit Window Templates Formats
Rolodex
Status Center
+ Memos & Letters
- Rollout Memo - May 19, 1987
- Resignation Letter - keep on file, just in c
- Termination Letter - re-usable
+ Daily Appointments Calendar
+ Monday, June 10, 1987
+ Tuesday, June 11, 1987
- 03:00 AM: Pre-dawn Pep Rally
- 09:00 AM: Corp-Con Auditorium, Cl
Chapter 4
Idea Processing
Chapter 5
Spreadsheets
Directions from SFO
Directions from San Francisco Airport
As you are leaving the airport, follow the signs marked "Freeway". This refers to US 101. Take 101 North, toward San Francisco.
One of the first exits on 101 North is for Interstate 380, to San Bruno. Take this exit. You can only go in one direction on 380.
Interstate 380 goes uphill (and southwest, although I am not sure of this), and intersects Interstate 280. Take 280 South.
change Close

WHO WILL BUY?

Apple is usually hesitant to position its products to address specific market segments, preferring to let the market (and third-party developers) define the markets and applications best suited for the machines. But in some cases segmenting is unavoidable.

For example, with the Mac II's color, sound and expandability, it's a natural for CAD/CAM, high-end design and production, and desktop engineering applications. It's a number-crunching monster, so it'll be well suited for high-end business applications. And with the ability to run UNIX, it'll be competitive in the lucrative workstation market.

The SE will be aimed at the markets currently satisfied by the Plus and the 512Ke: higher education and low-end business. Apple also views their low-end products as workstations in Mac work groups.

For the time being, Apple will continue to offer both the Mac Plus and the 512Ke. They claim that the three "closed Macs" constitute a low-end "family," with entry-level pricing for the 512Ke, and an expandable model (the SE) at the high end. Since there will be no upgrade path from the 512Ke or the Plus to the SE or the Mac II, I think we'll see the 512Ke and the Plus phased out as inventory becomes depleted.

Why MS DOS?

Apple's latest announcements include products that offer MS DOS compatibility on a variety of levels. First, the connectivity level: In January, Apple announced their PC AppleTalk card, which will allow PCs and Macs to share files while attached via AppleTalk. At the same time, Apple announced the availability of software products that allow file transfer and conversion between MS DOS and the Mac.

Concurrent with the Mac SE and Mac II announcements, Apple is unveiling two 5.25-inch disk drives — one for the SE and one for the II — that will allow the new Macs to read and write MFM

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More people use our Microsoft® BASIC than any other language on the Macintosh.™ Why? Because it's a powerful language that's simple and easy to use. But now there's a new, more advanced version available.

Introducing Microsoft's BASIC Interpreter for the Macintosh, Version 3.0.

Start with programming itself. We've used all the power of the Macintosh to make the process as effortless as possible. The full-screen editor and interactive debugging let you get your programs up and running quickly. Faster and easier than with any other language.

So advanced it's BASIC.

Don't worry about being restricted by the language. This new version features improvements like a block IF/THEN statement to make structured programming a snap. And we've just added a complete programmer's toolbox from Clear Lake Research. So now building your most advanced programs can be as simple as putting the pieces together. And it doesn't stop there.

Experienced programmers will like the easy access to the Macintosh ROMs—over 140 routines available through the toolbox. And there's advanced support for the Mac's sound and graphics, as well as the new hierarchical file system. There's even support for the Apple® LaserWriter.

Lastly, we've added a new runtime interpreter to the package. So now you can share your finished programs without extra cost or hassle.

When you look at all that the Microsoft BASIC Interpreter has to offer, the choice is clear. Even the price is easy to handle. Only $99 for the most popular language on the Macintosh.

If you're ready to stretch your programming muscles, give us a call at (800) 426-9400. In Washington State and Alaska, (206) 882-8088. In Canada, call (416) 673-7638. We'll give you the name of your nearest Microsoft dealer.

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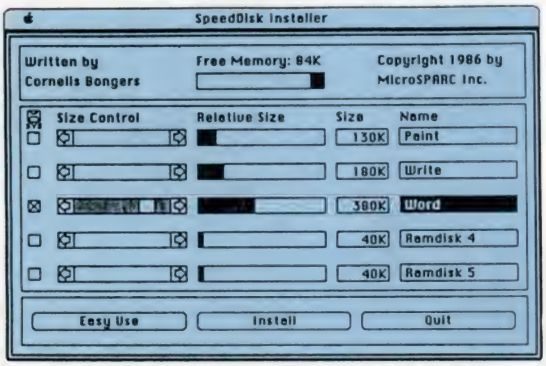

It's Easy with SpeedDisk!

The SpeedDisk System creates ultra-fast, simulated disk drives in your Macintosh's memory. These "memory" disks, or RAM disks, are identical to normal floppy disks, only they run up to 10 times faster! And they're easy to use . . . a double-click does it.

If your Macintosh has only one disk drive, the SpeedDisk System is indispensable! You can now have a second, third, or even more disks in memory (limited only by the memory size of your system).

If you are a Power User, **you can assign applications and documents to their own RAM disks in advance**. Then you can boot or switch between applications with a double-click of the mouse and there it is — your application with its own, customized RAM memory disk — ready-to-go.

Even more! SpeedDisk lets you save and restore the contents of your RAM disks automatically.

SpeedDisk is simple enough for the beginner and gives more than enough power to the expert. It's a great time-saver and you won't believe the convenience!

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☐ I want SpeedDisk! Here's my $29.95 (postpaid)

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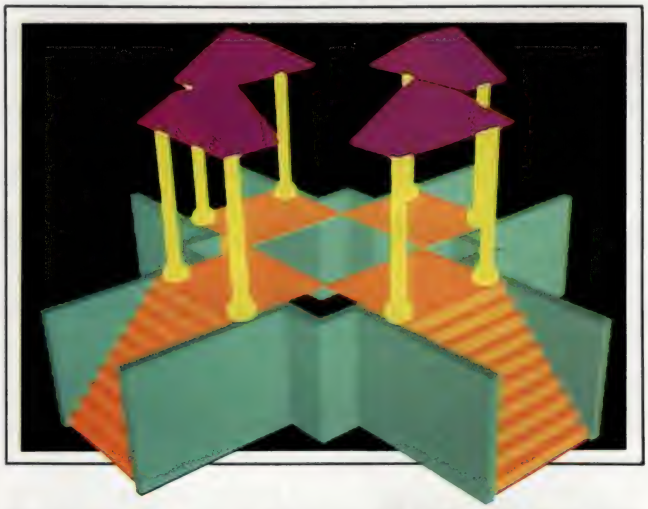
Mass. residents add 5% sales tax. Payments must be made in U.S. funds only.

(MS DOS formatted) disks. For example, you'll be able to put a 5.25-inch Lotus 1-2-3 data disk into the 5.25-inch drive, and convert data from it into a form that can be read by Excel. Likewise, you'll be able to transfer (or "export") an Omnis 3 Plus database file to an MS DOS disk, for use by dBase III.

Apple's also announcing the availability (through a third party) of two coprocessing boards that give the Mac SE and the Mac II the ability to run MS DOS software. The board for the SE will contain an 8086 processor, and the one for the Mac II will carry an 80286, and will be able to address the II's memory as if it were PC extended memory. This means that you'll be able to run PC-compatible applications (like Lotus 1-2-3 and dBase III) on the Macintoshes.

Personally, I always thought that it was ludicrous to want to run MS DOS applications on a Mac; why not just buy a low-priced clone? But Apple's Charlie Oppenheimer opened my eyes about the *real* value of MS DOS compatibility on the Mac. He pointed out

FIGURE 2: Sample CAD/CAM Image



that the new Macs will be able to run MS DOS applications while maintaining access to cut-and-paste functions and desk accessories. You'll be able to, say, generate a graph using 1-2-3, and then copy and paste it into a MacWrite document.

But there's an even more powerful factor that will work in Apple's favor. The fact is, one of the main obstacles to mass acceptance of the Mac by Corporate America is its lack of MS DOS compatibility. Shortsighted MIS managers have drawn up configuration requirements insisting that all PCs be able to run MS DOS applications. Despite these requirements, Macs have been sneaking in the back door, usually buried in office product budgets that aren't susceptible to MIS scrutiny. Now, with compatible Macs, the MS DOS requirement is satisfied, and Macs can start pouring in the *front* doors paid for by fat MIS budgets. It's irrelevant whether the machines are ever used to run MS DOS applications! One more interesting note: the Mac II will be the only computer that can run all three major PC operating systems: Macintosh, MS DOS and UNIX.

THE FUTURE LOOKS BRIGHT

We can expect to see some amazing new software and hardware products developed for the new Macs. Living Videotext's MORE takes on new dimensions with the addition of color (see **Figure 1**). We'll see some serious desktop engineering and CAD/CAM products, like Dimensions from Visual Information (see **Figure 2**). And the slots will be filled with devices that now are unimaginable . . . exotic display monitors, network hardware, data acquisition devices . . . it's already exciting! Next issue, we'll look at some of these new products in our On the Mac Scene column.

Break the BASIC speed limit.

If you've been cruising along with Microsoft® BASIC, get ready for the fast lane. Because the new Microsoft BASIC Compiler for the Macintosh™ is going to blow your socks off. This BASIC was designed for speeding.

Getting higher performance from your existing programs is easy. Just run them through our compiler. And then stand back. Because the speed increase can be phenomenal. Over ten times faster on the straightaway.

Don't lose time in the pits.

Faster time on the track would be pointless if you had to make pitstops for converting your programs. No problem. This compiler is as compatible as you can get with the Microsoft BASIC Interpreter for the Macintosh. All the features you've grown accustomed to are still around. From windows and graphics commands to music and sound effects. Dialog boxes and mouse commands. The works.

But we have to confess. Once we got under the hood we couldn't help tinkering a bit. So in addition to all the standard features of the Microsoft BASIC Interpreter, we added a few kickers. Power options like the new SELECT/CASE statement and block IF/THEN structures. Support for recursive procedures. And more. Now you can slide through the toughest BASIC curves without slowing down.

So shift your programs into high gear. Give us a call at (800) 426-9400. In Washington State and Alaska, (206) 882-8088. In Canada call (416) 673-7638. We'll give you the fast track to your nearest Microsoft dealer.

Microsoft BASIC Compiler Version 1.0
for the Apple Macintosh

Compatibility with Microsoft BASIC Interpreter for the Macintosh
- Executes the entire language as defined by the Microsoft BASIC Interpreter.
- Includes new features of the Microsoft BASIC Interpreter Version 3.0 such as block IF/THEN, HFS extensions, and a library of routines to easily access the Macintosh Toolbox.
- Graphics and animation support with access to QuickDraw routines.
- Sound effects with up to four simultaneous voices.

Other Compiler Advantages
- Executes Microsoft BASIC Interpreter programs 10-30 times faster.
- Create standalone programs without runtime fees.

Structured Programming Support
- Block IF/THEN/ELSE/END IF eliminates the need for GOTO statements.
- SELECT/CASE statements for powerful alternative to IF/THEN/ELSE.
- Fully recursive subprograms can be called by name and accept passed parameters.
- Alphanumeric labels can be used to make your programs more readable; line numbers are optional.

Large Program and Math Support
- No program size limitations; code and data can use up to available memory.
- STATIC arrays for optimal performance—DYNAMIC arrays for flexibility.
- Choose from binary and binary-coded decimal (BCD) math packages.

Compiler Options
- Compile a pre-defined list of files, or select individual files.
- Execute immediately upon compilation.
- Arrays default to STATIC or DYNAMIC.
- Transfer to editor.
- Optional long addressing for full memory usage.
- Optional array bound and stack checking.
- Optional runtime event checking.
- Link runtime into application, or keep separate.
- Several format choices for program listing.

Microsoft® BASIC Compiler

The High Performance Software

Microsoft BASIC Compiler for the Macintosh is a version of the Absoft BASIC Compiler, licensed from Absoft Corporation, Rochester Hills, Michigan.
Microsoft is a registered trademark of Microsoft Corporation. Macintosh is a trademark licensed to Apple Computer, Inc. by McIntosh Laboratory, Inc.

Mike Linkovich, 31 Prestwick Crescent, Willowdale, Ontario, Canada M2H 1N1. Painter can be compiled using the C,N,R,U options of the Microsoft BASIC Compiler 1.0.

Painter gives you some of the tools you always wished MacPaint had, such as a realistic drybrush, inverting brush, and pattern painter. Get away from the computer-generated look — with Painter!

FEATURE ARTICLE

PAINTER

by Mike Linkovich

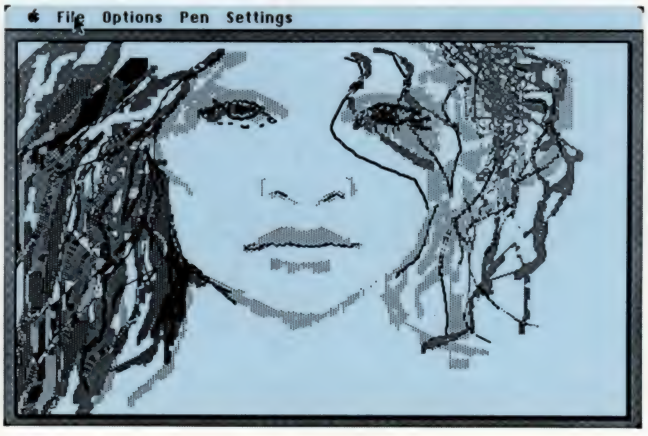
MacPaint is nearly perfect software. Its elegance and simplicity have made it a favorite since its release in 1983. It's not quite perfect, though. Try using MacPaint for a quick, bold sketch. Does it look like a painting? Probably not. The lines are too uniform and precise. They look computer generated, not human generated. With Painter, you can get the look and feel of real paintbrush strokes.

Painter has three tools, five patterns, and three different pen sizes. The tools are a drybrush simulation, a pattern brush that constantly changes its flow of patterns, and an inverting brush that changes its appearance more and more as you sweep the same area with it. They allow you to create entirely different effects from those found with MacPaint, or any other paint program I've seen.

USING PAINTER

To start Painter, select Start from the Run menu. One blank window fills the screen, and there are two menus at the top of the screen. You can try Painter immediately by clicking and dragging the mouse within the window, as you would with the brush in MacPaint. The tool you are using is the drybrush, which produces an uneven swath (**Figure 1**). To try out the other tools, pull down the Options menu, and select either Pattern Paint or Inverting Paint. Test these tools in the same manner as you did the Drybrush. You may also change the pattern with which to paint (except when using Pattern Paint) and the size of the brush (except when using Drybrush) by making a selection from the Pen menu.

FIGURE 1: Drybrush Example



To save your work, select Save from the file menu. As usual, you can reload the file with the Open function. To print out a hard copy on the printer, use the Print function.

THE SETTINGS MENU

Choosing an item from the Settings menu allows you to change the values that Painter uses to determine the shape and pat-

terns of the different brushes. When you select a Settings item, a dialog box appears. These dialog boxes contain the values Painter uses to control the type of line drawn by the brushes. The Drybrush Variable selection allows you to alter the minimum and maximum width and height that the brush will use. The Patterns selection allows you to select from the five patterns that the Pattern Paint brush can use (**Figure 2**). Finally, the Pen Sizes option lets you edit the default dimensions of the small, medium and large brushes.

PAINTING TIPS

Although learning how to work Painter is very simple, mastering its tools may take some time. Here are some hints to help you get started. When you're using Painter, try not to pay too much attention to details; MacPaint is fine at handling those. Instead, use Painter to work on the pages as a whole. Take care to work on the composition of the picture and the dramatic effects of lighting and shadow. Use the Drybrush to boldly darken, as for shadows, or lighten for highlights. Pattern Paint should be used when you want to show the flow of the object, or interesting textures. Use strokes that flow in the same direction as the motion in your picture.

Inverting Paint may be the hardest to master, but you can use it to create some strange effects. Often you can simulate broken glass by going over an area many times with different directions of strokes. Odd textures can be created with different strokes. You will find you must go over areas with the Drybrush to add more defined light and shadow.

Don't forget to try using all of the effects, patterns and brush sizes with different combinations; you may come up with some interesting results. By limiting the sizes of the Drybrush, or canceling out patterns from the Pattern Paint brush, you can create brushes that work more like MacPaint's. For example, setting the maximum and minimum sizes of the Drybrush to the same value causes only one, continuous size of swath to be painted.

> Although learning how to work Painter is very simple, mastering its tools may take some time.

CREATING MACPAINT DOCUMENTS

If you wish to create a picture that MacPaint can load directly, simply use the key combination Shift-Command-3. When you press these keys, the Mac will save the entire contents of the screen on disk as a MacPaint file called Screen 0. MacPaint can load this file for you to edit and save like any other MacPaint drawing. You can also save the entire picture on the Clipboard, by selecting Save On Clipboard from the File menu. Then exit Painter, run MacPaint (or Fullpaint or other graphics program), and select Paste from the Edit menu to transfer the picture.

ENTERING THE PROGRAM

To enter the program, use MS BASIC version 2.0 (binary) or higher, and type in **Listing 1**. Macintosh Plus owners should use 2.1 or higher. Save the program as Painter. For help with entering programs, see the directions at the beginning of the Program Listings Section of this magazine.

HOW IT WORKS

Because so many graphic tools are built into the Mac, creating Painter was simply a matter of designing methods to use these tools in imaginative ways. Most of my ideas arose out of asking "What if?" and experimenting. Because so many of the program's functions are already in the Mac's ROM, there is virtually no speed difference between Painter and MacPaint, even though Painter is written entirely in BASIC. If you compile it with the new Microsoft compiler, it's even faster.

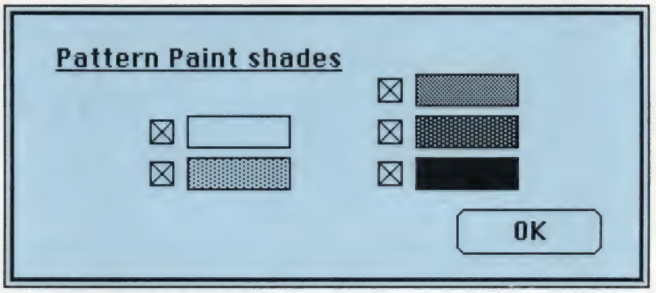


FIGURE 2: Paint Patterns

The Painting routine waits until the mouse button is pressed. When it is pressed, a MOVETO command positions the pen at the mouse location. Then it enters a loop that uses the LINETO command to draw a continuous line to where the mouse is dragged. Within this loop, Painter will either GOSUB the DryBrush subroutine or the Pat.Paint subroutine, according to the tool selected (Invert Paint needs no routine because its brush does not change). The DryBrush routine picks a random brush size from the range of sizes specified in the Settings dialog box, and the Pat.Paint routine selects a random pattern out of the ones selected from the Settings dialog box.

To save the picture, Painter executes a PICTURE ON statement, PUTs the image at 0,0 and stores the data in G$. Next, Painter OPENs a disk file under the name selected in the Save As dialog box and sends G$ to it. That file is renamed with the file type "PNTR" so that it will display only Painter files when you open a file.

Opening a file is the reverse of saving it. First, the file is OPENed, and G$ is retrieved. G$ is then placed on the screen with the command PICTURE,G$, which places it in the same position as it was when saved.

Printing a file is very similar to saving it. When Print is selected, Painter puts the picture into G$ as above, and then sends that picture to the printer.

PRINTING WITH THE LASERWRITER

Painter will print your document on the LaserWriter the same as on the ImageWriter. Be sure to have the LaserWriter selected before you print. One line of the program must be changed. By changing the line that reads:

```
PICTURE(70,150),G$
```

to:

```
PICTURE(50,150),G$
```

the picture is then centered on the 8½ × 11 inch page.

ADDING TO PAINTER

Painter is a fairly flexible program. If you come up with another idea for a brush, this is how you would add it to the program:

1. Insert its name into the Options menu.
2. Create an initialization routine that the MenuFix routine will call, labeled "{brush}.1".
3. Create (if needed) its update routine, which is called from within the PaintLoop with the brush name as the label. This routine should contain any needed setup for the brush.

There may be some other change that you need to make, depending on the nature of your tool, but the most basic changes have been outlined above.

Painter listings begin on page 49

a common criminal.

She doesn't look like a common criminal. But she just copied software illegally. It's not a common crime. It's a Federal offense.

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REVIEW BOARD

THOUGHT PROCESSORS

Our reviewer examines some of the new generation of outline processors — programs capable of actually helping you think!

Reviewed by Jan G. Eugenides, P.O. Box 151, Maynard, MA 01754

I'll admit it. I used to despise outlining. Whenever I had to submit an outline for anything in high school or college, I put it off until the last moment and then hurriedly scribbled some headings and subheadings with little regard for structure. Usually, my finished papers would bear little or no resemblance to the original outline.

To my amazement, that has all changed now, thanks to the new generation of outline processors. I write all of my articles in outline form nowadays, filling in the details as I go, merrily rearranging topics and subtopics until it all gels. I honestly never want to write without an outliner, ever again.

The four products reviewed here are examples of the very best such programs ever written. Their power and flexibility is wonderful to behold. Hence the title of this article. The first two, MindWrite from MindWorks, Inc., and MORE, from Living Videotext, Inc., are such unique products that I felt it best to review them separately. The second two, Acta from Symmetry Corp., and Voila! from Target Software, are direct competitors, so I reviewed them together.

Table 1 provides a quick comparison of the programs' respective features. However, don't make the mistake of only comparing the programs feature for feature. Each is written for a specific purpose, and each has advantages and disadvantages.

MINDWRITE

MindWrite is an integrated word processor and outliner. When you create a new document, it looks like a normal word processor document. The interesting thing is that at any time you can treat it as an outline if you like.

If you just type in paragraphs as you would in a word processor, there's no obvious difference between MindWrite and, say, MacWrite, other than some additions to the scroll bars and a different menu bar arrangement. It has rulers similar to MacWrite's, and a font and style menu that operate in the standard fashion. MindWrite can handle multiple fonts within a paragraph. It has headers and footers — again much like MacWrite's — and you can justify text in a variety of ways.

Once you have typed in a few paragraphs, some headings or both, you can treat them as you would in an outliner. You can grab an entire paragraph and drag it to another position (no copy and paste, just drag it

FIGURE 1: Dragging a Paragraph in MindWrite

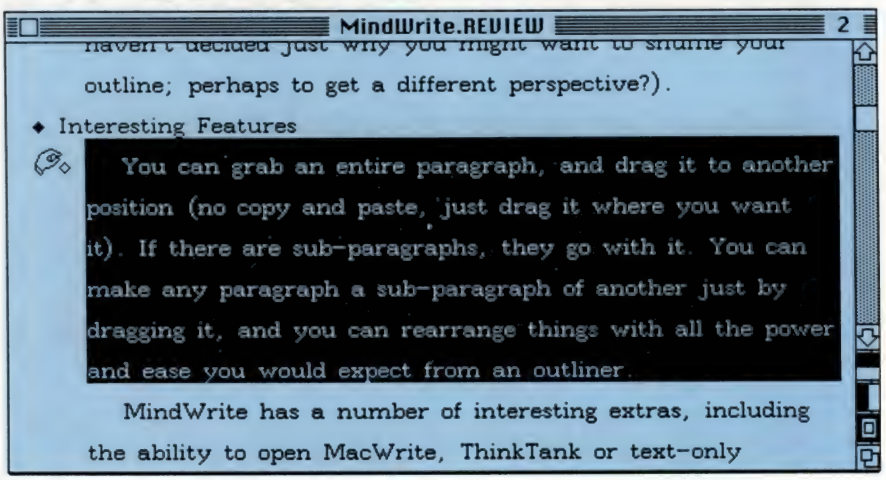
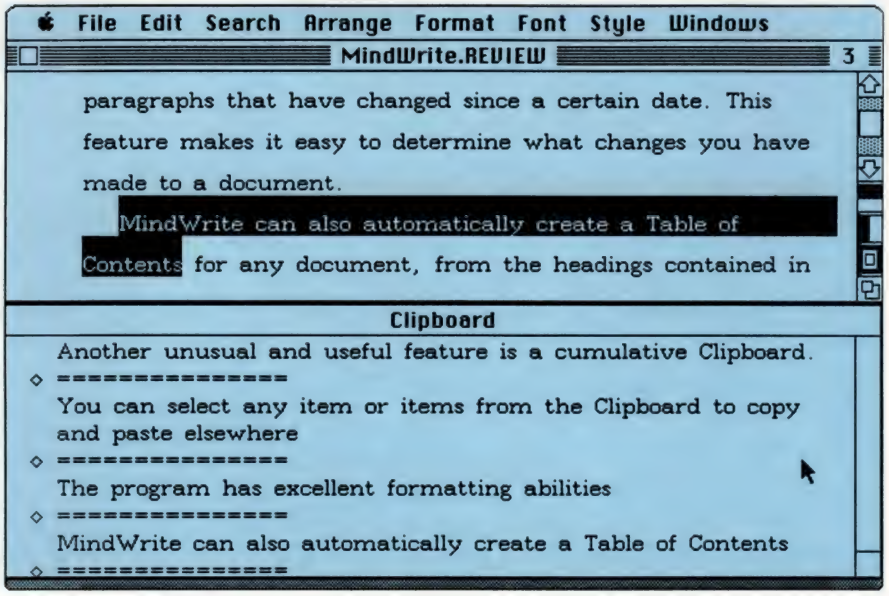

MindWrite.REVIEW
2
outline; perhaps to get a different perspective?).
◆ Interesting Features
You can grab an entire paragraph, and drag it to another position (no copy and paste, just drag it where you want it). If there are sub-paragraphs, they go with it. You can make any paragraph a sub-paragraph of another just by dragging it, and you can rearrange things with all the power and ease you would expect from an outliner.
MindWrite has a number of interesting extras, including the ability to open MacWrite, ThinkTank or text-only

FIGURE 2: MindWrite's Cumulative Clipboard


File Edit Search Arrange Format Font Style Windows
MindWrite.REVIEW 3
paragraphs that have changed since a certain date. This feature makes it easy to determine what changes you have made to a document.
MindWrite can also automatically create a Table of Contents for any document, from the headings contained in
Clipboard
Another unusual and useful feature is a cumulative Clipboard.
==========
You can select any item or items from the Clipboard to copy and paste elsewhere
==========
The program has excellent formatting abilities
==========
MindWrite can also automatically create a Table of Contents
==========

where you want it) (**Figure 1**). If there are sub-paragraphs, they go with it. You can make any paragraph a sub-paragraph of another just by dragging it, and you can rearrange things with all the power and ease you would expect from an outliner. You can collapse headings to get an overall view of your document, or expand everything to see the details.

Of course, MindWrite can also be used as an outline processor, and it has all the features you need most such as Move Left, Move Right, Show All Subordinates, Hide All Subordinates, etc. It also has a number of features you might not expect but which give it even more power, such as Flatten Hierarchy, Sort, Sort Backwards, and Shuffle (I haven't decided just why you might want to shuffle your outline; perhaps to get a different perspective?)

Interesting Features

MindWrite has a number of interesting extras, including the ability to open MacWrite, ThinkTank or text-only documents.

MindWrite has a number of interesting extras . . .

It can also save documents in MacWrite or text-only format. It can display any number of windows, including several windows of one document. This allows you to easily view different parts of the same document.

MindWrite has a very nice Preferences screen, which allows you to configure the program to your liking. This includes setting the default font, showing or hiding page breaks, showing or hiding rulers and first level labels, a number of search options, Command key shortcuts, and other such conveniences.

MindWrite also has some useful additions to the vertical scroll bar. There are three new controls there, and they allow you to instantly resize the window into a number of useful configurations, including quarter-size (in any part of the screen), half-size (either vertically or horizontally), and of course full-screen.

Another unusual and useful feature is a cumulative Clipboard (**Figure 2**). You can actually append items to the Clipboard without losing the current contents. The Clipboard acts like a separate document. As you copy items, they accumulate in the Clipboard, and you can display the contents at any time. You can select any item or items from the Clipboard to copy and paste elsewhere, and you can even rearrange and edit the Clipboard, with all of MindWrite's editing and outlining abilities. Even more, you can use the search and find options to gather all of the paragraphs that contain the search text into a new document.

The program has excellent formatting abilities, including multilevel rulers. You can easily create separate formats for different levels of your document, and you can treat headings separately from body text.

Yet another unusual feature (this program is packed with them) is the ability to mark all paragraphs that have changed since a certain date. This makes it easy to determine what changes you have made to a document.

MindWrite can also automatically create a Table of Contents for any document from the headings contained in it.

Documentation

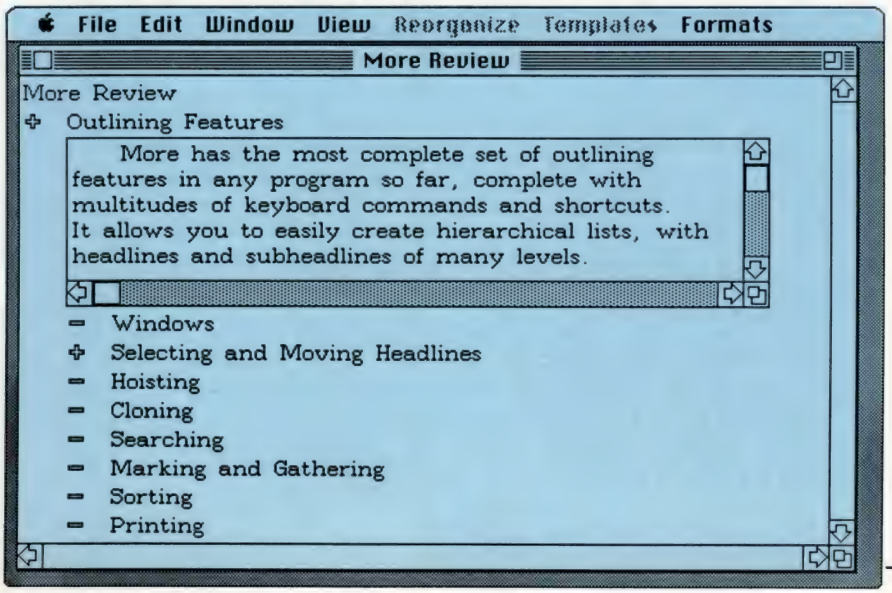
The manual for MindWrite is excellent, containing a thorough tutorial, an extensive "using" section, and a good reference section. It is laid out much like Apple's own fine manuals, and information is easy to find and clearly presented.

Bugs and Problems

Of course, all is not completely rosy. This first release of the program does have some flaws. At worst, they can cause the program to crash. At best, they are annoying.

I ran into one mysterious bug that was caused by trying to move a paragraph to the right, thereby making it a sub-paragraph of the one above it. Several times the program completely froze when I tried this. It seemed to happen only under the very first heading. The only way out was to reset and reboot. I also had the program freeze up on me while trying to convert some headings to paragraphs, and once it bombed while dragging a heading from one position to another.

FIGURE 3: Expander Window in MORE


File Edit Window View Reorganize Templates Formats
More Review
More Review
Outlining Features
More has the most complete set of outlining features in any program so far, complete with multitudes of keyboard commands and shortcuts. It allows you to easily create hierarchical lists, with headlines and subheadlines of many levels.
Windows
Selecting and Moving Headlines
Hoisting
Cloning
Searching
Marking and Gathering
Sorting
Printing

I also discovered that the line of equal signs that separates items on the Clipboard should not be touched. The manual states that this line cannot be copied or highlighted, but I tried it anyway just to see what would happen. Oops. The program bombed completely.

Choosing Use Section Numbers For All Headings from the Format menu would almost always crash the program unless the outline was completely collapsed.

The program is rather slow to display new text on the screen as you type, especially with long paragraphs. I found myself typing ahead of the display quite often and this can be annoying. The program never dropped any characters, but without instant visual feedback there is a tendency to make typographical errors, and I often found myself backspacing too far because the cursor lagged behind my keystrokes.

Sometimes, after saving a file, moving a paragraph or while scrolling, the screen is not properly updated and the text appears scrambled. Large blank areas sometimes appear in the text. Forcing a screen update by scrolling the text off the screen and then back on usually fixes the problem. I found that things generally ran much smoother if the headers, footers and page breaks were not displayed.

There is also a spurious screen update that occurs fairly often. Suddenly, for no apparent reason, the entire screen is cleared and then redrawn. It doesn't seem to hurt anything, but it is unusual. I also found that occasionally some extra space would appear between paragraphs. Again, scrolling would fix it, and hiding the headers, footers, and page breaks seemed to eliminate it.

Weirdly, the program does not have any horizontal scroll bars. If you resize a window so that it is too narrow to display the whole width of the text, you cannot scroll sideways to view it. You do have the option of wrapping the text to fit the window, if you like. Ideally, both options should be available.

Though the program supports the Macintosh Plus cursor keys, there is one cosmetic problem. If you are using a narrow window with wide text, it is possible to move the flashing cursor right into the middle of the scroll bar with the Right-Arrow.

A Right Mind

MindWrite is quite an impressive program, with many powerful and unique features. Of the programs reviewed, it comes the closest to being a complete writer's tool, able to be used either as an outliner or word processor, or both. Its price is very reasonable. If the bugs can be cleaned up (I'm sure they can), and if MindWork has a decent upgrade policy, MindWrite could be the program of choice for many.

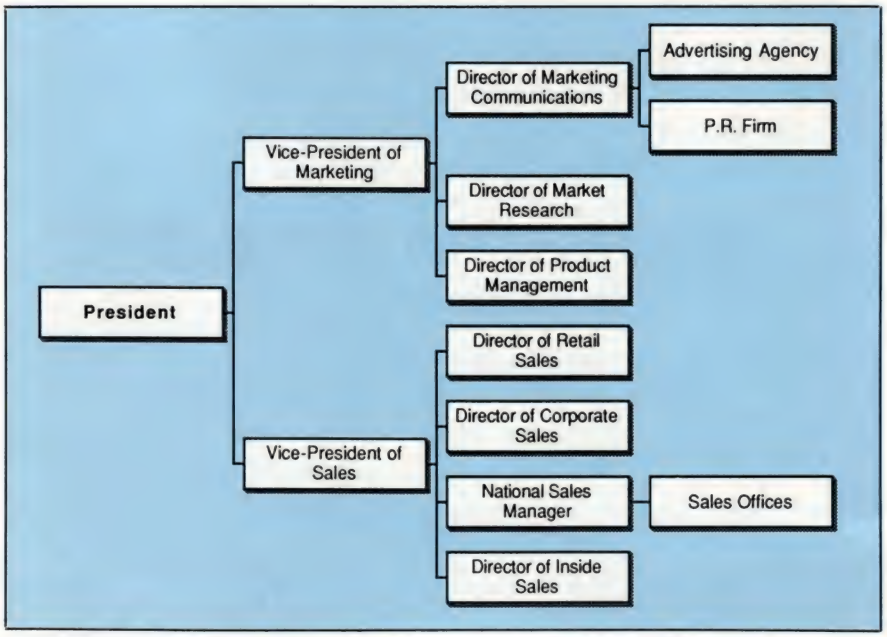


FIGURE 4: Tree Chart in MORE

MORE

MORE, from Living Videotext, Inc., has the most complete set of outlining features in any program ever, with multitudes of keyboard commands and shortcuts. It allows you to easily create and edit complex outlines, with headlines and subheadlines of many levels. Unlike MindWrite, it cannot behave completely like a word processor although it has many word processing features. It is a power outliner extraordinaire, with some unique and powerful presentation functions that are not available in any other program, anywhere.

Windows

MORE has several types of windows. Headlines and subheadlines are displayed in their own window, called an outline window. Up to six outline windows can be open at once, and MORE includes many convenient commands for quickly resizing and displaying multiple windows. These include zoom in, zoom out, and several tile and overlay commands. The multiple windows make it easy to cut and paste between outlines and to compare outlines.

Each headline (or subheadline) is preceded by a "leader character" that indicates what type of headline it is. There are four types of headlines: empty, filled, clone and marked. An empty headline has no subheads beneath it. A filled headline has one or more subheads. A clone headline is one that has been created from another (see Cloning, below), and a marked headline is one that you have put a mark on, prior to gathering several headlines into a new outline (see Marking and Gathering).

Each headline or subheadline can have another window attached to it, called an expander, which can contain text or graphics (**Figure 3**). Detailed information related to the headline or subheadline can be typed into a document window, or a graphics window can be used to include a picture, graph, or chart. The windows are standard, resizable Macintosh windows with scroll bars. If you are a die-hard ThinkTank enthusiast, you can opt to use ThinkTank-style "hot borders" instead of the standard Mac scroll bars.

There are also several special-purpose windows available, including the Calendar window. The Calendar window allows you to see a calendar of any month and year, and to set up a calendar outline. By simply selecting a day or range of days, indicating the time interval, and clicking a button, you can create appointment calendars, things-to-do lists, travel schedules and more.

Selecting and Moving Headlines

Each headline, along with all of its subheads, is treated as a separate object that can be selected, moved, cut, copied and pasted. Rearranging the order of headlines is simply a matter of dragging the mouse or pressing a Command key combination. Similarly, you can change the level of headlines and subheadlines easily.

The mouse commands are standard: point, click and drag. You can expand and collapse headlines, edit the text, move things around, and copy portions of the outline just with the mouse. About the only thing you can't do with the mouse is actually enter the text.

The keyboard commands are intuitive: pressing Return when a headline is selected creates another headline beneath it at the

TABLE 1: Comparison of Thought Processor Features

Product:	Acta	MindWrite	More	Voila!
Type:	Desk accessory	Application	Application	Desk accessory
Size:	40K	228K	319K	85K
RAM Required:	30K	288K	320K	40K
Headings:	2,000[1]	Available memory[2]	Available memory	32,000
Expanders:	N/A	N/A	Available memory	32,000[3]
Heading Length:	32,767	Available memory	127 characters	80 characters
Maximum Outline Size:	Available memory	Available disk space	Available memory	Available memory
Documents Open Simultaneously:	1	Available memory[4]	6	1
Graphics Windows:	Yes[5]	Yes	Yes	Yes
Templates:	0	1 per folder	28	0
Tree Charts and Bullet Charts:	No	No	Yes	No
Multiple Fonts:	Limited[6]	Yes	Yes	Limited[6]
Search and Replace:	Search only	Yes[7]	Yes[7]	Yes
Mark and Gather:	No	Yes[8]	Yes	No
Hoisting and Cloning:	No	No	Yes	No
Sort Subheads:	Yes	Yes	Yes	Yes
Calculate Sums:	No	No	Yes	No
Built-in Calendar:	No	No	Yes	No
Phone Dialing:	No	No	Yes	No
Slide Show:	No	No	Yes	No
Automatic Table of Contents:	No	Yes	Yes	No
Printers Supported:	ImageWriter, LaserWriter	ImageWriter, LaserWriter	ImageWriter,[9] LaserWriter	ImageWriter, LaserWriter
Convert Text to Outlines:	Yes[10]	Yes[11]	Yes[11]	Yes[10]
File Formats Read:	Acta[12]	MindWrite, MacWrite, ThinkTank, text	More, ThinkTank 512, Voila!, text	Voila!, More, ThinkTank
File Formats Written:	Acta, MacWrite, text	MindWrite, MacWrite, text	More, Ready!, ThinkTank, MacWrite, Jazz, Word, Voila!, MacDraw, text	Voila!, More, ThinkTank
Copy Protected:	No	No	No	No
Outline Types:	Numeric, Arabic, Custom, bullet	Numeric, bullet	Leader, Harvard, legal, Numeric, bullet	Roman, Arabic, STD, bullet
Undo:	Yes	Yes	Yes	No
Price:	$59.95	$125	$295	$99

1. Practical limit is 30 due to screen width
2. Maximum of 256 pages per file
3. Maximum of 32,000 characters each
4. Allows multiple windows of one document
5. Non-scrollable, horizontally
6. No mixed fonts within paragraphs
7. Includes wildcard pattern matching
8. Using the search function
9. Color supported
10. Converts selected text to outline form
11. Reads formatted text files directly
12. Includes conversion program for MORE and ThinkTank files

same level. Pressing Tab then moves the new headline to the right, making it a subhead of the one above it. Shift-Tab moves it back to the left. Pressing Enter opens a document/graphics window beneath the selected headline, and pressing Enter again closes it. "Command-." collapses subheads, and "Command-," expands them. There are many, many more keyboard commands, all of which make it easier and faster to manipulate your outline.

Fonts and Styles

You can select a font and size for all your headlines. You can set the type style (such as boldface or underline) for a range of headlines, for individual headlines or individual characters or words within a headline. Text entered into document windows can be a different font, size or style from the headlines. You can even mix multiple fonts, sizes or styles within the text and headlines, just like you can with a word processor.

Hoisting

Two commands that make it easier to work on complex outlines are Hoist and De-Hoist. They allow you to zoom in and out on specific headlines. When you hoist a headline, it temporarily becomes the top headline of the list, and only it and its subordinates appear on the screen. De-hoisting returns a headline to its original relationship within the whole outline.

continued on next page

Cloning

The Clone command allows you to make one or more dynamic copies of any headline. Whenever a change is made to any one of the clones, all of the other clones change as well. This allows you to put the same information in more than one place in your outline, and update it all at once.

For example, if you had an outline of your company hierarchy, showing each person's position within the overall company, and also had a section of the same outline that listed the people in each department, you could fill in the department section with clones from the overall company outline. Then, when a person left the company or changed addresses, you could update the entire list by changing the information just once.

Searching

MORE has a powerful and flexible search and replace function. It allows the normal Search, Change, Change Then Search, and Change All functions, and adds the ability to match patterns (by using wildcard characters). It also has the ability to restrict the search to the current headline and its subordinates, or to only those topics that are currently expanded. You can even mark all headlines or document windows that contain the search string (see Marking and Gathering).

American Technologies Annual Meeting

I. Opening remarks, Mel Singleton, President

II. Formal Meeting, Mark Schaffler, Secretary

III. Videotape Presentations

IV. Informal Discussion - Questions and Answers

FIGURE 5: Bullet Chart in MORE

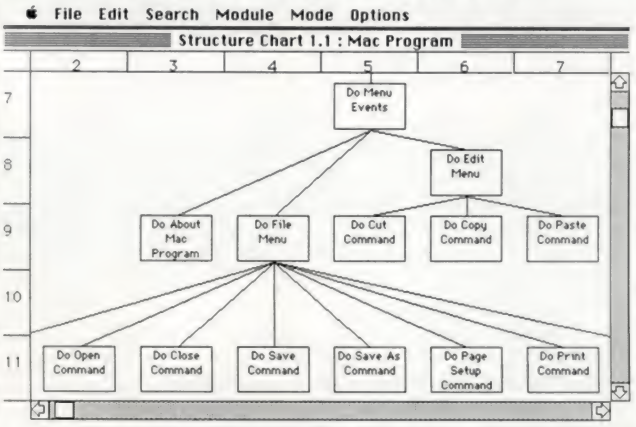
The pattern matching abilities are extensive. For example, the question mark (?) can be used to match any single character. The asterisk (*), when placed after another character or range of characters, will match any occurrence of that character or range of characters, no matter what other characters follow. The tilde (~) matches any character except the one immediately following it. By combining these and other wildcard characters, you can perform very flexible and selective search and replace operations on your outlines.

Marking and Gathering

The Mark command can be used to mark any headline for later retrieval with the Gather command. For example, if you have a list of people's names and addresses, and you want to send a letter to certain ones, you can go through the outline and mark each desired name. Then use Gather to create a new list of only the marked names. You can also use the search command to mark items that match certain criteria and then gather those into a new outline.

These two commands make it very easy to create new outlines from your current

Structure Chart Software



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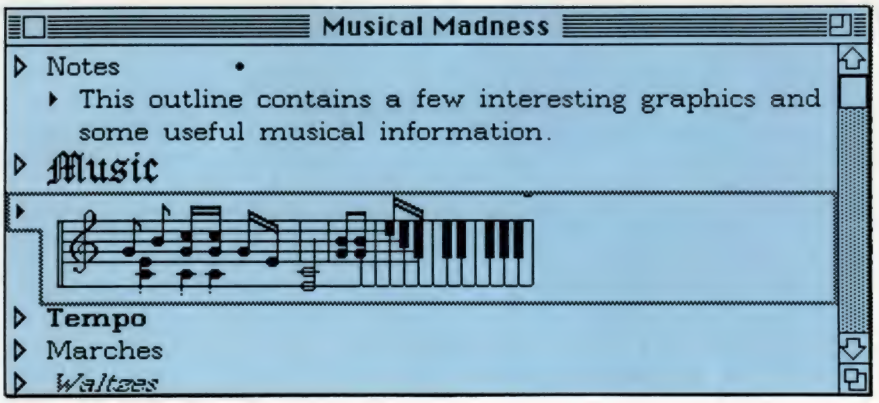

FIGURE 6: Acta Display

information and to rearrange it for other uses.

Sorting

At any time, you can sort all the subheads of any headline into ascending or descending order simply by selecting the headline, and then selecting Sort from the Reorganize menu. This can be an easy way to order items such as names or zip codes.

Printing

MORE has all of the standard printing features, including the ability to print to the ImageWriter or LaserWriter. You have full control over headline and document spacing, indentation and centering. You can also control the label style to create leader, Harvard, legal, numeric, and bullet outlines. You can control page breaks, include simple one-line headers and footers, and print automatic page numbers. You can even print in color if you have an ImageWriter II and a color ribbon.

MORE can print a Table of Contents from your outline, according to your needs. You have control over the indentation, style, and color of headlines in the Table of Contents.

PRESENTATION FEATURES

What really sets MORE apart from other outliners is its ability to transform your outlines into presentation quality tree charts and bullet charts. You can take any outline or section of an outline and transform it instantly into a professional looking chart. The result is a presentation that looks like you hired both an artist and a typesetter.

For example, I teach a Sunday school Bible class at church. The other teachers generally scribble on the chalk board or use easels with paper. I just spend an evening each week outlining the material. Then I transform it into bullet charts and print it on the LaserWriter. Finally, I copy it onto overhead transparency film. It's very easy to do, and the results are impressive. The first time I showed the material to my pastor (an IBM aficionado), he said, "Where did you buy this? It's great!" When I told him I had done the whole thing the previous evening on my Macintosh, he was astonished.

Tree Charts

To create a tree chart, you just select the headline you want to transform, and select Tree Chart from the View menu (or press Command-J) (**Figure 4**). The chart is instantly displayed, and a number of adjustments can be made to it to suit your needs. You can control the size and shape of the boxes in the tree, the type of lines drawn between them, the font, the direction, and you can even put drop shadows behind the boxes if you like.

Once you've gotten the chart the way you want it, you can print it, or you can copy

continued on next page

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SIEVE		
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MBASIC™ compiler	10.	50
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Compile: Editor to stand-alone application.
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SHELL: Sort of 2000, 100 char strings.
*Turbo Pascal limited to array length of 32K so sort wasn't done. **Requires interpreter.

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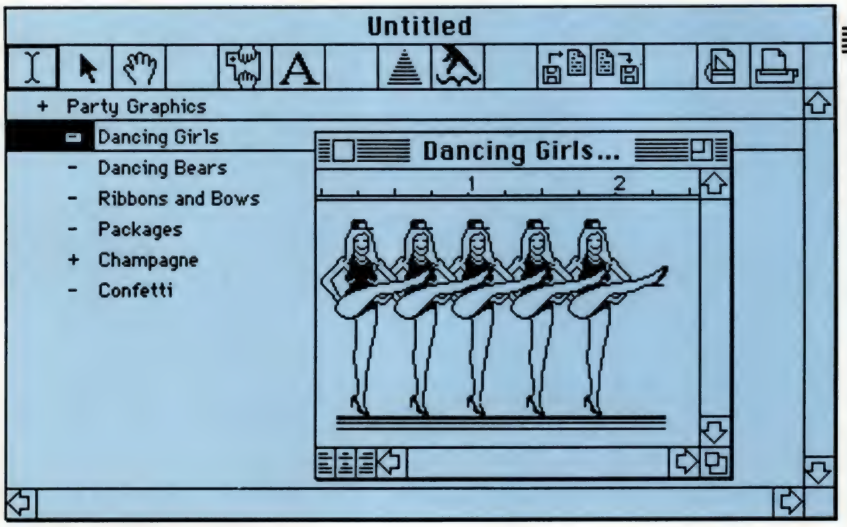

FIGURE 7: Voila! Display

it to the Clipboard and paste it into a graphics window somewhere else in the outline, into the Scrapbook, or into MacPaint. You can also save it directly in MacDraw format, if you choose (each item appears as a separate object in MacDraw).

Bullet Charts

Bullet charts are just as easy to create as tree charts. Just select the headline, then select Bullet Chart from the View menu or press Command-I (**Figure 5**). You have a number of controls over the appearance of your charts including font size, font style, bullet type (Figure 5 uses Roman Numerals), and border shape and width. Like tree charts, the bullet charts can be copied and pasted, and saved as MacDraw documents.

Bullet charts can be displayed in a slide show format, with a variable time delay between each chart, and multi-level charts can be created.

OTHER FEATURES

MORE has a large number of extra features intended to enhance the power of the program and to provide you with more flexibility and productivity.

Templates

A template is a pre-created outline, or section of an outline, that you can install in the Templates menu. Once installed, it can be inserted into your current outline by simply selecting it from the menu. You can create address files, expense logs, appointment calendars, etc., and install them directly into MORE's menus where they are always available.

Time and Date Formats

MORE can enter the current date and time into your outline. You can select from a number of time formats, including 12-hour and 24-hour formats, with or without seconds. There are also three date formats: numeric (e.g., 04/20/87), abbreviated (e.g., Mon., Apr. 20, 1987), and full (e.g., Monday, April 20, 1987).

Calculations

MORE has the unusual ability to calculate sums from an outline. For example, you could enter your expense report into an outline and then select Calculate from the Edit menu to total all of the expenses. Subtotals are put in the subheadings automatically.

Phone Dialing

If you have a Hayes-compatible modem, you can use MORE to dial a number for you

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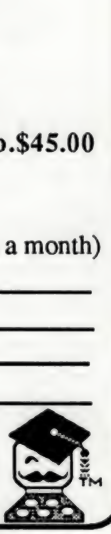

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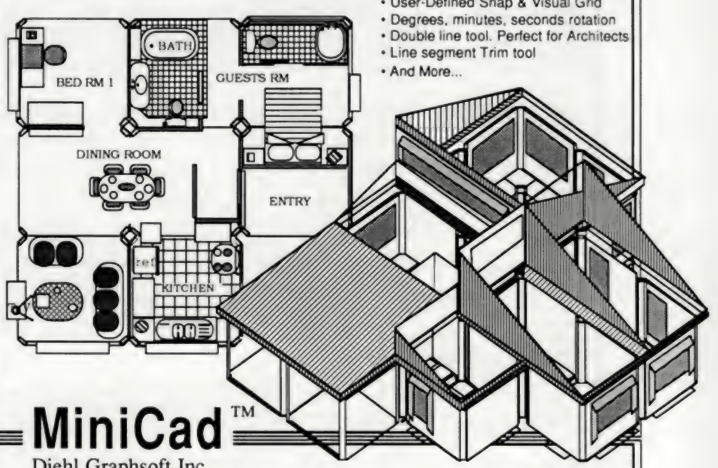

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from any headline in your outline. Just select the headline, and select Dial Phone from the Edit menu. After the phone is dialed, pick up the receiver.

Data Import/Export

MORE outlines can be saved in several formats including MORE, Ready!, ThinkTank, and ThinkTank IBM. They can also be exported to Microsoft Word, MacWrite, Jazz, plain text files, or text files with tabs. You can control the format of the exported file and select the label types (leader, numeric, Harvard, legal, bullets, or none).

You can create a document in a word processor that can be read into MORE as an outline. To do so, you make a file that has text with tabs or one that has text with spaces. Each line of text becomes a headline in MORE, with the indentation determined by the tabs or spaces. For example, if a line has two tabs at the beginning, it becomes a second level subhead. If it has three tabs, it becomes a third level subhead, and so on. MORE can also read ThinkTank 512 and Voila! files directly.

CONCLUSION

With all its powerful outlining functions, coupled with its presentation abilities and many extra features, MORE is undoubtedly the premium idea processor available today. It *is* rather high-priced, at $295. Is it worth it? That all depends on what you plan to do with it. If all you need is an occasional outline, MORE is probably overkill for you. On the other hand, if you teach a class, make any kind of regular presentations, or if you do a lot of writing or brainstorming, MORE will make you more productive. And that's what computers are all about.

ACTA VS. VOILA!

Voila!, from Target Software, and Acta, from Symmetry Corp., are two outliners in desk accessory form. They are quite different in their implementation, although they perform essentially the same function: provide a solidly functional outliner that is available from within any application.

There is a definite advantage to having your outliner available from within other applications. Often your best ideas come while you're working on something, and with a desk accessory you don't have to stop what you're doing to open up an outline and make a few notes, make a list, or arrange some ideas. It also makes it easy to copy and paste material between the outline and whatever document you may be working on in the application, whether it be a word processor, spreadsheet, or graphics program.

Overview

Acta is comparatively small, requiring only 52K of disk space and 30K of free memory. It is the least expensive of all the programs reviewed. Though it lacks many of the more sophisticated functions of MORE, it has all of the most-used outlining abilities. It is very well designed to fill its particular niche.

Voila! is considerably larger than Acta, requiring 85K of disk space and also requires more free memory in which to run (40K). Voila! also lacks most of the more sophisticated functions. Both programs are eminently usable; both are very solid. Their main differences lie in their underlying philosophy of design.

Headings and Expanders

Acta is like MindWrite in that headings can be full paragraphs, if desired, up to 32,000 characters long (**Figure 6**). In fact, like MindWrite, Acta functions very much like a word processor with outlining abilities. Acta supports multiple fonts, but you are limited to one font per paragraph.

Voila! is more like MORE. Headings are limited to 80 characters in length, and you can open expander documents for each heading that appear in their own windows (**Figure 7**). The expander windows even have their own rulers, so you can set the

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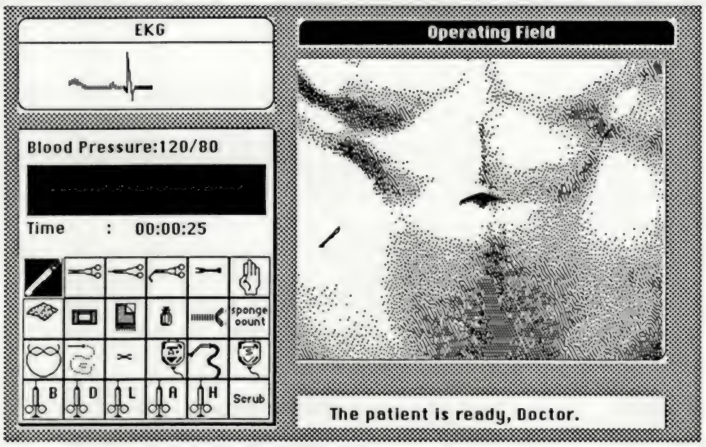

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CLR SpeechLib contains statements for producing synthesized speech from MS-BASIC using Apple's MacinTalk (included with SpeechLib). No additional hardware is required.

CLR Graph3DLib contains statements for 3-dimensional graphics. Advanced features include three-dimensional clipping and setting the point of view independently from the coordinates of the object itself.

VideoWorks is a program that creates sophisticated animation sequences. **CLR VWLib** allows you to play a VideoWorks movie from MS-BASIC either in its entirety or in small steps. VideoWorks is not included with VWLib.

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MS-BASIC 2.0 or higher or the MS-BASIC compiler is required but not included. VideoWorks is a trademark of MacroMind.

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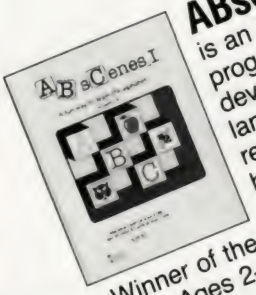

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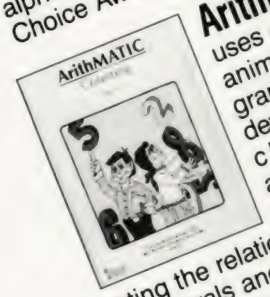

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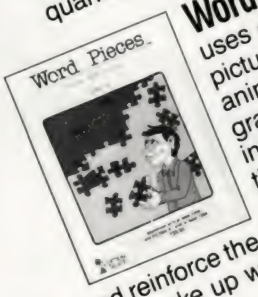

Word Pieces™ uses colorful pictures and animated graphics to introduce the child to phonetics and reinforce the concept that letters make up words. Ages 3-6.

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margins separately. The text in an expander is limited to 32,000 characters, and like Acta, you are limited to one font per expander.

Commands

Acta has Command key equivalents for most of its menu functions, including Move Left, Move Right, Find, etc. Manipulation of headings and subheadings can be done easily with the mouse, and sorting and searching are easy.

Voila! also implements Command key equivalents for most of its functions, and adds a number of icons at the top of the window to control many options. It is slightly easier to click an icon than select a menu item. Rearranging things with the mouse is easy, and the sorting function is simple but functional. While Acta has a search only function, Voila! implements a full global search and replace. This can be a definite advantage at times.

Graphics

Both Acta and Voila! support graphics. In Acta, any heading or subheading can contain a graphic imported from MacPaint or other graphics program, instead of the usual text. The picture is displayed normally, but if it is too wide to fit on the screen, you cannot scroll sideways to see other parts of it. An interesting feature of Acta is its ability to display "squeezed down" versions of the topics and subtopics. If the topic contains text, you can see the first line; if it contains a picture, you can see the top part of it. This semi-collapsed display is unique to Acta, and it allows you to get a better overall view of your document than a fully collapsed display provides.

Voila! can accept graphics in its expander windows. You cannot have both text and graphics in one window, but you do have scroll bars so you can see the entire picture.

Including graphics allows both programs to act as more powerful versions of the Scrapbook. You can make an outline of the names of each picture and then paste the picture itself into a subhead or expander window. When the outline is expanded, the pictures are displayed and can be copied and pasted. When you collapse the outline, only the names appear, and they can be easily sorted or relocated.

Printing and Data Export

Both Acta and Voila! have full printing capabilities, either to the ImageWriter or the LaserWriter.

Acta supports the three major outline label types, and when you save the file as a MacWrite or text document, you can select which format you prefer: numeric, Arabic or bullet (or none). You can also create custom formats by editing the bullet characters. Saving as a MacWrite document preserves all your font information, so that items that were in a certain font or style in your Acta document will remain the same font and style in the MacWrite document. Since most word processors can read MacWrite files, this allows you to transfer your outline intact to the one of your choice.

Voila! supports four outline types: numeric, Arabic, STD or bullet (or none), but these are for printing only. When you save the file as text-only to load into your word processor, there are no labels attached and all font information is lost. If you plan to move your outlines into a word processor, this is a serious disadvantage.

Data Import

Acta does not have any direct data import abilities. You cannot load a text file into it. However, it comes with a program that will convert text files or ThinkTank 512 files into Acta format. If you use MORE, you can save the outline in ThinkTank 512 format and then convert it to Acta format. Acta also includes a "smart paste" command that will treat the contents of the clipboard as if it were an outline. This allows you to copy text from another outliner, a word processor or spreadsheet and paste it directly into Acta as an outline.

Voila! will not load a text file either, but it does have the ability to transform any selected text into an outline. This means that you can select a section of text in your word processor or other application and Voila! will load it in as an outline. If you set up the file properly beforehand, transforming it to an outline works well. However, with unprepared documents, long paragraphs are sometimes truncated at the 80-character heading limit with the full paragraph in an expander. This can make the result less than desirable. Voila! will read ThinkTank 512 files directly, without conversion. Both ThinkTank 512 and MORE can read Voila! files.

Smart Quotes

Acta has one feature that none of the others have (if you do much printing on the LaserWriter, you'll appreciate it). It's called Smart Quotes, and it automatically transforms the standard straight quotes (") to the more attractive curly ones (''), thus saving you the trouble of trying to find the right Option key combination to type them yourself.

Random Selection

Voila! shares one unusual feature with MindWrite: the ability to select discontiguous sections of the outline. This can be handy for copying random portions of an outline and then pasting them into a word processor. It does not work for copying and pasting within the outline.

Which is Right for You?

The answer to that question depends on your needs. Acta is the best value, and requires less disk space. If you want to move

your outlines to a word processor with labels intact, it is definitely the best choice. If you want horizontally scrollable graphics and instant compatibility with MORE and ThinkTank, Voila! is the one for you. Either way, I think you'll find, as I have, that an outliner that's always available is a wonderful productivity tool.

CONCLUSIONS

Software for the Macintosh has improved radically over the past year, and there is no end in sight. As developers begin to more fully exploit the possibilities of the Macintosh, the vistas of magnified productivity expand before us. Tasks that used to be tedious chores, such as outlining, become joyful exercises of the mind. The results are improved clarity and more accurate communication. What will the next generation bring? I can hardly wait to find out.

LATE BREAKING NEWS

Just before going to press, I spoke with the folks at MindWorks and they told me that they are planning an upgrade this quarter. It will be free to all registered users, and along with bug fixes will include enhanced support for spelling checkers and large screens.

We also received a pre-release version of Borland's upgraded SideKick package, which includes an outline processor called Outlook. Although there wasn't time to include it in our review, we felt it deserved mentioning. It has all of the basic outlining functions, and includes these extra features:

1. Comes in both desk accessory and application formats.
2. Opens text, MacWrite, Microsoft Word and outline documents. Can have more than one document open at once, limited only by available memory.
3. Includes a Resume feature.
4. Has expander icons.
5. Supports split selections.
6. Supports graphics.
7. Prints to the ImageWriter and LaserWriter
8. Supports standard, modern, and short modern numbering methods.
9. Includes a global search and replace function.
10. Includes special auto-scrolling features for fast movement through the document.

Outlook is not available separately, but only as part of the SideKick package, which sells for $99.95. For more information, contact Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066.

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USER VIEWS

AN OVERVIEW OF BASIC 3.0

Microsoft has just released a new, greatly enhanced version of BASIC. Here's the scoop on the new features.

Microsoft (MS) BASIC is the language of choice of many Macintosh users. It was the first BASIC language on the market (in fact, it was released at the same time that Apple released the Macintosh in 1984). For a while, it was the *only* Macintosh BASIC available. As other BASICs have appeared, Microsoft has updated MS BASIC to continue to meet the needs of users.

Novice programmers, in particular, have enjoyed MS BASIC's simplicity and ease of use. More advanced programmers, on the other hand, have complained about lack of ROM support. It was impossible to access most of the powerful Toolbox routines from previous versions of MS BASIC. To get at the Toolbox, you could buy add-on libraries of subroutines developed by Clear Lake Research (CLR). The CLR libraries accessed over 150 ROM routines and were a bargain at $35 apiece.

The new revision supports over 150 ROM routines . . .

The folks at Microsoft know a good thing when they see it. They have included the CLR libraries in their latest update, version 3.0 of the BASIC interpreter.

THE PACKAGE

I ordered the upgrade (BASIC 3.0) for $25. The package arrived a few weeks later. It includes two disks, a brief explanation of the new features and disk files, and a 75-page addendum to the MS BASIC manual explaining the CLR libraries. This addendum only covers the new routines. The new features and commands, as well as manual updates, are explained in a text file on the disk.

The addendum itself is well written and rich with sample programs and examples. It's rather vague about some of the more detailed concepts, though. There's more than enough explanation for the casual programmer, but if you plan to get into the nitty-gritty of the Toolbox, you'll need a copy of *Inside Macintosh* (from Apple Computer).

There are nine demonstration programs on the disk. All are good examples of what the MS BASIC 3.0 can do. They demonstrate, among other things: using Command key equivalents; scroll boxes; getting patterns, pictures, and cursors from the resource fork of a file; using alert and dialog boxes without using any of the six BASIC windows (changed from four in the previous version); and dragging a gray outline of an object.

NEW FEATURES

The new revision supports over 150 ROM routines via the CLR libraries. In addition, the run-time interpreter is included free of charge. You can now include this program on any disks you sell that have MS BASIC programs without paying a licensing fee.

The new ROM package is excellent. It contains routines for manipulation of arrays and ROM calls to handle: clipping regions, dialogs, alerts, extra graphics calls, icons, mapping, menus, mouse commands, patterns, pictures, points, polygons, rectangles, regions, resource files, scroll bars, strings, text, and windows (whew!). Using these calls, there isn't much that can't be done from BASIC.

Some commands have been enhanced and others have been added. A CHDIR command has been added that changes the default folder (the folder in which BASIC looks when it encounters a CHAIN, OPEN, RUN, or any other command that requires a file name).

by Scott Barta, 2175 East Messner Rd., Wooster, OH 44691

```
'Scroll Bar
'A sample program
'From Microsoft

'requires Microsoft Basic Version 3.0 (binary)
'This program will not run under previous
'versions.

LIBRARY"ToolLib"
OPTION BASE 1
linenum%=0:top%=0:s!=0:in%=0
SetRect scr%(1),3,6,114,111
    'scroll area
SetRect bar%(1),113,6,129,111
    'scroll bar
FRAMERECT VARPTR(scr%(1))
    'frame scroll area
NewScroll s!,bar%(1),1,1,10,1
    'create scroll bar
FOR n=1 TO 10: READ n$:s$(n)=n$:NEXT n
DATA one,two,three,four,five
DATA six,seven,eight,nine,ten
LOCATE 8,1
DrawText "Click outside scroll area to end program"
loop:
ScrollText s!,scr%(1),s$(1),top%,10,linenum%,4
    'final argument is for scroll delay
    'linenum% is 0 first time, nothing highlighted
IF MOUSE(0)=0 THEN loop
GetMouse pt%(1)
PtInRect pt%(1),scr%(1),in%
    'click inside scroll area
IF NOT in% THEN disposescroll s!:END
linenum%=top%+(pt%(1)-scr%(1))\19
    'calculate line of array clicked on
top%=0
ScrollText s!,scr%(1),s$(1),top%,10,linenum%,4
    'linenum% is highlighted with this redraw
WHILE MOUSE(0)<>0:WEND
        'wait for mouse up
GOTO loop
```

EXAMPLE 1: Scroll Bar

Its format is:

CHDIR *Pathname*

where *Pathname* specifies first the name of the disk, and then the names of the successive folders, each separated by a colon. For example:

```
CHDIR "Data Disk:Folder 1:Folder 2"
```

The EDIT FIELD command has been enhanced to include some new field types, numbered 5, 6, 7 and 8. These types are exactly like 1, 2, 3 and 4, except that text in the new types is not automatically highlighted for deletion or change.

The FILE$( ) command now returns the full pathname leading to a file instead of just the volume name followed by the file name. This used to be a problem for Hierarchical File System (HFS) users who tried to use this command to access files inside of folders.

New commands have been added for block IF/THEN/ELSE/END IF statements. These commands make it possible to put more than one line between IF/THEN/ELSE statements, as follows:

```
IF Condition=1 THEN
      'Statement 1
      'Statement 2
      'Any additional statements
ELSE
      'Alternate statement 1
      'Alternate statement 2
      'Additional alternate statements
ENDIF
```

TABLE 1: Variables

Variable	Function
bar%( )	Defines rectangle containing scroll bar
in%	1—Click was in scroll area; 0—Click was not in scroll area
linenum%	Number of line to highlight
n	Counter used to read in number data
n$	Temporary storage for number data
pt%( )	Storage for point where mouse was clicked
s!	Scroll bar handle
s$( )	Number data array
scr%( )	Scroll rectangle where text is displayed
top%	The string in the array at the top of the scroll area

A SADD function has been added that returns the starting address of a string. This is useful to call ROM routines that require a pointer to a string. This function parallels the VARPTR function for numeric variables. Its format is:

SADD(*StringExpression*)

where *StringExpression* is a string variable. In a command, it looks like:

```
SADD(MyString$)
```

As mentioned before, another feature is the increase in the number of output windows from four to six. A Transfer command has been added to the Edit menu to allow the transfer directly to another application without first quitting to the Finder. A Basic Startup application has been added that will automatically start up a binary or decimal BASIC program whose name is specified in a separate text file when the disk is booted. Finally, BASIC can now send output to the LaserWriter if it is opened as an "LPT:" or "LPT: PROMPT" file.

> . . . programs can be written to do almost anything previously accessible only through another language.

Microsoft has also just released a BASIC compiler. Briefly, the compiler converts standard BASIC programs into standalone applications that run much faster. Combined with the new ROM Toolbox support, the compiler makes MS BASIC a serious development language. Look for a review in an upcoming issue of *Nibble Mac*.

A SAMPLE PROGRAM

Example 1 is one of the sample programs that appears on the version 3.0 disk. The program displays a scroll bar on the screen. You can use it to scroll through a list of numbers from one to ten. Clicking in an area outside the scroll bar ends the program. Please

continued on page 66

WORKING SMARTER

DOUG COBB'S EXCEL TIPS

More useful Excel Tips from Doug Cobb's latest book on Excel!

OPTION KEY INSERT

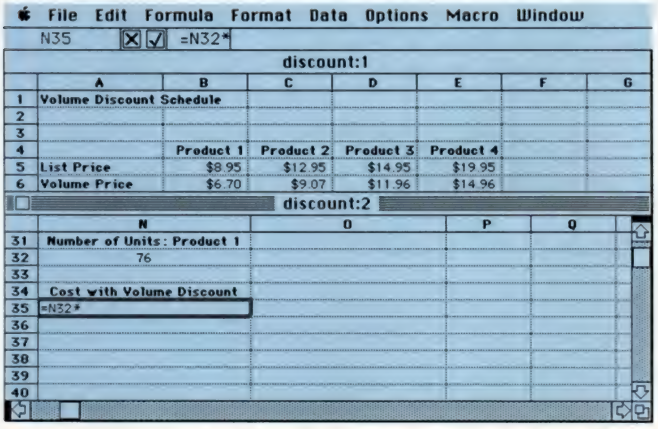
To insert cells quickly, press the Option key as you drag across the rows or columns you wish to insert.

You usually insert cells in a worksheet by dragging through the rows or columns you wish to insert and choosing the Insert... command or pressing Command-I. Here's a shortcut: Hold down the Option key as you drag across the rows or columns you wish to insert. When you release the mouse button, Microsoft Excel will present the Insert dialog box as if you had chosen Insert... from the Edit menu.

To insert a row or column throughout the entire worksheet, press the Option key and select the appropriate row or column header. Microsoft Excel will bypass the Insert dialog box and insert the row or column automatically.

This month's Excel Tips are excerpted from the book Tips for Microsoft Excel *by Douglas Cobb, published by Microsoft Press, 16011 NW 36th, Box 97017, Redmond, WA 98073; $22.95. Our thanks to Microsoft Press' Karen Meredith for her cooperation.*

FIGURE 1A



QUICK POINTING WINDOWS

As you create a formula, you can use windows to point quickly to cells in remote areas of the worksheet.

Suppose you are working with a large worksheet and you are using two windows to look at different areas, as shown in **Figure 1A**. Window Discount:1 is set up to display cells A1:G6, while window Discount:2 is set up to display cells N31:Q40. As you look at the worksheet through window Discount:2, you decide to enter this formula in cell N35:

*=N32*B6*

To enter the reference to cell B6 quickly, enter the first half of the formula:

*=N32**

Click in window Discount:1 (or select its name from the Window menu), and click on cell B6.

File Edit Formula Format Data Options Macro Window

B6 =N32*B6

discount:1

	A	B	C	D	E	F	G
1	Volume Discount Schedule						
2							
3							
4		Product 1	Product 2	Product 3	Product 4		
5	List Price	$8.95	$12.95	$14.95	$19.95		
6	Volume Price	$6.70	$9.07	$11.96	$14.96		
7							
8	Volume Discount	25%					
9							
10							
34	Cost with Volume Discount						
35	=N32*B6						
36							
37							
38							
39							
40							
41							

FIGURE 1B

As you see in **Figure 1B**, Microsoft Excel will partially activate the first window (that is, the selected window will come to the top of the stack, and its scroll bars will become active, so you can move around to view the sheet). A marquee appears around cell B6 to show the selection.

Now lock in the formula by pressing Return or Enter or by clicking the enter box. Microsoft Excel will bring window Discount:2 back to the top of the stack automatically as it displays the results of the formula.

FIGURE 2A

File Edit Formula Format Data Options Macro Window

G10

exam scores

	A	B	C	D	E	F	G
1	Second Semester Exam Scores						
2							
3	Name	Exam 1	Exam 2	Exam 3	Final	Average	
4	Adams	79	80	82	83	81	
5	Benson	78	83	86	88	83.75	
6	Clay	95	95	93	96	94.75	
7	Harrison	92	96	96	98	95.5	
8	Lawrence	94	97	94	96	95.25	
9	Smith	87	89	92	91	89.75	
10	Stanley	86	84	88	87	86.25	

FIGURE 2B

File Edit Formula Format Data Options Macro Window

A13 =AND(E4>90,F4>90)

exam scores

	A	B	C	D	E	F	G
12							
13	FALSE						
14							
15	Name	Exam 1	Exam 2	Exam 3	Final	Average	
16	Clay	95	95	93	96	94.75	
17	Harrison	92	96	96	98	95.5	
18	Lawrence	94	97	94	96	95.25	
19							
20							
21							

FIGURE 2C

File Edit Formula Format Data Options Macro Window

A13 =OR(E4>90,F4>90)

exam scores

	A	B	C	D	E	F	G
12							
13	FALSE						
14							
15	Name	Exam 1	Exam 2	Exam 3	Final	Average	
16	Clay	95	95	93	96	94.75	
17	Harrison	92	96	96	98	95.5	
18	Lawrence	94	97	94	96	95.25	
19	Smith	87	89	92	91	89.75	
20							
21							

File Edit Formula Format Data Options Macro Window

A16

smokers

	A	B	C	D	E	F	G
1	Smoking Survey						
2							
3	Males	Under 18	18-25	26-35	36-45	46 and Over	Average
4	Less than 20/day	20%	24%	27%	29%	28%	26%
5	20-30/day	13%	14%	16%	20%	22%	17%
6	More than 30/day	5%	8%	9%	12%	15%	10%
7	Stopped Smoking	27%	28%	31%	28%	28%	28%
8	Never Smoked	35%	26%	17%	11%	7%	19%
9							
10	Females	Under 18	18-25	26-35	36-45	46 and Over	Average
11	Less than 20/day	22%	26%	26%	29%	24%	25%
12	20-30/day	15%	17%	19%	20%	23%	19%
13	More than 30/day	5%	6%	7%	11%	9%	8%
14	Stopped Smoking	25%	27%	31%	28%	29%	28%
15	Never Smoked	33%	24%	17%	12%	15%	20%
16							
17							
18							
19							

FIGURE 3A

COMBINING WITH "AND" AND "OR"

The AND and OR functions let you set up multiple selection criteria in a single criteria formula.

You can use Microsoft Excel's logical AND and OR functions to combine two or more database criteria into one formula.

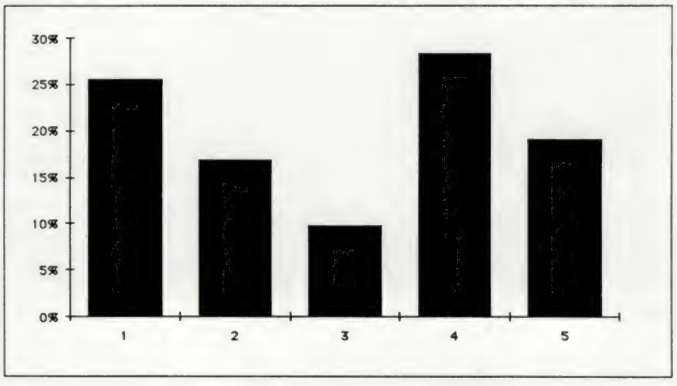
For example, suppose you want to extract the records for those students in the sample database in **Figure 2A** who scored higher than 90 on their final exams *and* whose average exam scores were higher than 90.

You could set up a calculated criteria format like this:

=AND(E4>90, F4>90)

to extract the needed records. This logical formula instructs Microsoft Excel to extract only those records that meet both criteria — that is, those records with a value greater than 90 in the Final field

FIGURE 3B



and a value greater than 90 in the Average field. **Figure 2B** shows the resulting extract range.

Similarly, to extract the records for students with final exam scores above 90 *or* average exam scores above 90 (or both), use a formula like this:

=OR(E4>90, F4>90)

When you use a logical OR function in your database criteria, you indicate that at least one of the conditions used must be true in order for a record to match the criterion. **Figure 2C** shows the extract range resulting from our OR criterion.

continued on next page

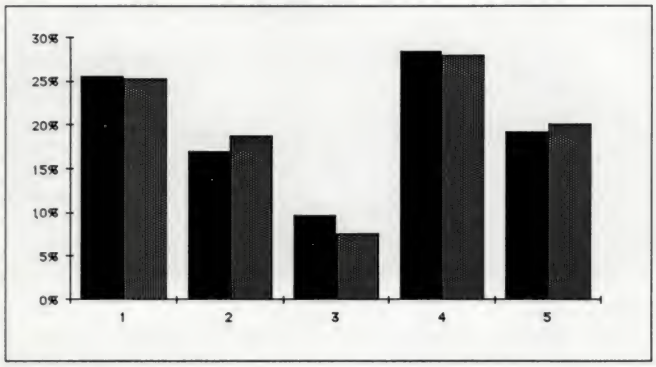


FIGURE 3C

PASTING RANGES

To plot discontinuous cell ranges, paste each data series into your chart individually.

Suppose you create a worksheet like the one in **Figure 3A**, and you want to chart the averages in cells G4:G8 and G11:G15. If you drag through cells G4:G8, press the Command key, and drag through cells G11:G15 before opening a new chart window, you will get the alert message *Can't perform operation on discontinuous selection.*

You may have received a similar message if you have ever tried to cut or copy a discontinuous range of cells in a worksheet. As you may have guessed, plotting chart values is similar to copying cell entries in a worksheet. Most rules concerning cutting, copying, and pasting values also apply to charts.

File Edit Formula Format Data Options Macro Window

A12

average sales

	A	B	C	D	E	F	G
1	1986 Average Sales by Product						
2							
3	Product 1	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr		
4	Region 1	$5,627	$5,664	$5,701	$5,737		
5	Region 2	$6,721	$6,758	$6,795	$6,831		
6	Region 3	$7,124	$7,161	$7,198	$7,234		
7							
8	Product 2						
9	Region 1	$5,027	$5,267	$5,214	$5,730		
10	Region 2	$6,021	$6,571	$6,235	$6,831		
11	Region 3	$7,101	$6,961	$7,108	$7,234		
12							
13							
14							
15							
16							
17							
18							
19							

FIGURE 4A

To chart two or more discontinuous ranges of cells in a single chart window, use the Copy and Paste commands to plot the data series one at a time. For example, to chart the data in cells G4:G8 and G11:G15 in **Figure 3A**, drag through cells G4:G8, select New... from the File menu, and double-click the Chart option. You will see a chart like the one in **Figure 3B**.

To add the second data series, activate the worksheet window again and drag through cells G11:G15. Select Copy from the Edit menu and reactivate the chart window. Finally, select the Paste command from the chart window Edit menu. **Figure 3C** shows the results.

You can use this technique to plot as many data series as you like. Microsoft Excel will display the data series in the order in which you paste them into the chart window.

CATEGORY LABELS FIRST

When you chart a discontinuous range of cells, be sure to plot the range that contains your category labels first.

Microsoft Excel always uses the category names from the first data series you plot to create your chart's category axis labels. If you don't select any labels when you plot data series, sequential values are used to label the category axis labels. Because the contents of the first data series control the appearance of the category axis labels, those sequential labels remain in effect even if the second data series does contain category labels.

To avoid this problem, make sure that the first range you plot contains the category labels you want to use. For example, suppose you want to chart the Region 1 sales data in cells A4:E4 and A9:E9 of the worksheet in **Figure 4A**. If you begin by dragging

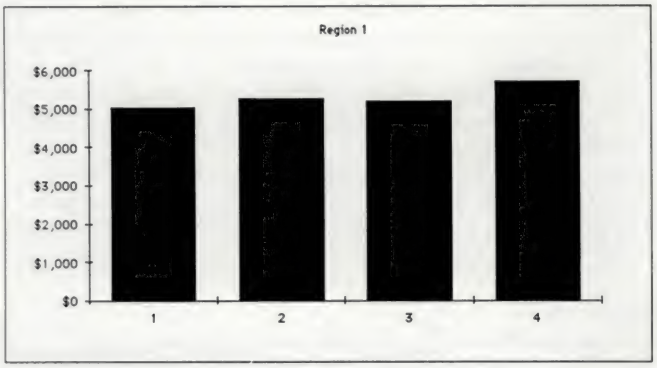


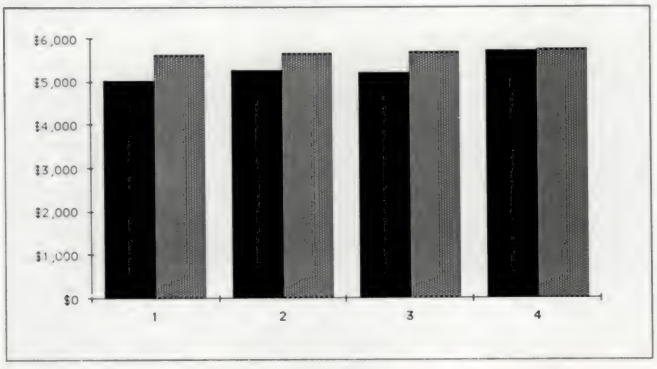
FIGURE 4B

through cells A9:E9 and opening a new chart window, you will see a chart like the one in **Figure 4B**. Notice that a series of sequential values is used to label the category axis because we did not include category labels in the range selection.

Now, suppose you paste the data from cells A3:E4 into the chart window that is shown in **Figure 4B** (notice that this range includes the labels in row 3). The chart will look like the one in **Figure 4C**. As you can see, the original category numbers are used, even though we provided a set of category labels for the chart.

To display the appropriate category labels, chart cells A3:E4 first, and then paste the data from cells A9:E9 into the chart. If you don't want the data for Product 2 to appear before the data for Product 1, you can also edit the SERIES formula to control the category axis display.

FIGURE 4C



File Edit Formula Format Data Options Macro Window

A1 | Student

grades

	A	B	C	D	E	F	G
1	Student	Exam 1	Exam 2				
2	Jones	88%	82%				
3	Adams	91%	88%				
4	Smith	94%	95%				
5	Little	97%	95%				
6	Miller	94%	88%				
7	Johnson	92%	86%				
8	Wright	89%	83%				
9	Evans	86%	80%				
10	Tailor	83%	77%				

FIGURE 5

PASTE SPECIAL

Use the Paste Special... command to control the distribution of data in the chart window.

Microsoft Excel assumes that you want your charts to contain more categories than data series. However, you can use the Paste Special... command to control the distribution of data in your charts.

Looking at the sample worksheet in **Figure 5**, suppose you want to use the data in cells A1:C10 to create a chart with only two categories. In other words, you want to use the labels Exam 1 and Exam 2 below the category axis. Within each category, you want to display each student's grades in a separate data series. To change the "default" distribution of the chart data, drag through cells A1:C10 and use the Copy command. Then open a new chart window and select Paste Special... from the chart window Edit menu. You will see the Paste Special dialog box shown in **Figure 6A**.

FIGURE 6A

Paste Special — OK — Cancel

Values in: ○ Rows ◉ Columns

☒ Series Names in First Row

☒ Categories in First Column

FIGURE 6B

Paste Special — OK — Cancel

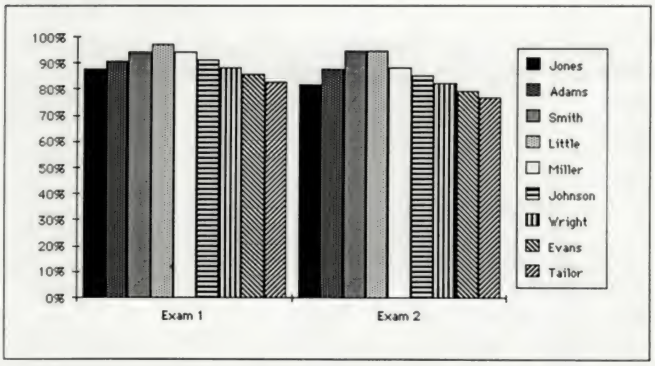
Values in: ◉ Rows ○ Columns

☒ Series Names in First Column

☒ Categories in First Row

Notice that the Values in Columns, Series Names in First Row, and Categories in First Column options are selected in the Paste Special dialog box. Because you selected a vertical range of cells, the program assumes you want to use each column as a category and each row as a data series.

FIGURE 6C



To change the distribution of the chart data, click the Rows option in the Values In box. Because you included labels in the top row and left column of the selected range, the Series Names and Categories options will change to read Series Names in First Column and Categories in First Row. **Figure 6B** shows the dialog box at this point. When you click OK to lock in your dialog box selection, you will get a chart like the one in **Figure 6C**. (We have added a legend to this chart to illustrate the way the data is organized into categories and series.)

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WORKING SMARTER

CALENDAR WORKS

Use Microsoft Works to create a full-featured calendar database. It stores dates, times of events and descriptions of the events, and prints out daily "do" lists and weekly or monthly schedules.

In Works on the Apple Macintosh, *author Charles Rubin follows the exploits of Al Chroma as he puts Microsoft Works to use in setting up his fictitious company, Videorama. In this excerpt, Al uses Works to create a calendar database.*

With all the activity involved in getting the Videorama off the ground (personal appointments, employee interviews, due dates for various license fees and bills, and vendor appointments), Al has found that he has many more things to do than he can remember, and he's having trouble organizing his day-to-day activities. A calendar is the obvious answer, and with the Works database, Al can make a calendar that will quickly produce daily "do" lists as well as lay out his schedule for the weeks and months ahead. Because he can have up to ten Works files on the desktop at a time, Al can load his calendar file every day and leave it on the desktop so it's instantly available whenever he needs it.

CREATING THE CALENDAR FILE

The calendar file we'll create is really very simple in terms of the number of data fields it contains. The secret lies in formatting the fields and creating useful reports. Let's begin by creating the file itself:

1. Load Microsoft Works.
2. Click on the database icon, and then click the New button. The Field Name window appears, ready for you to enter field names for the new file.

Before we enter field names, we need to think about the types of data we'll want to store in the calendar file. Calendars store dates and times of events, along with descriptions of the events themselves. So let's begin this file with three field names: Date, Time, and Event.

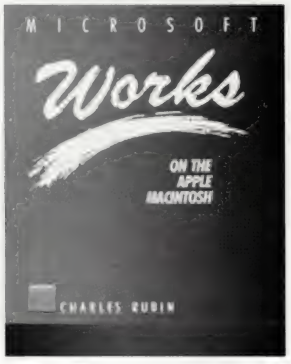
Type the field name **Date** in the Field Name window, and press Return or click the Add Field button to add this field to the database file. The field appears in the form window, and the Field Name window reappears, ready for the second field name.

Type the field name **Time** in the Field Name window, and press the Return key to add it to the file.

Type the field name **Event** and press the Return key to add it to the file. This is the final field you want to add to the file at this point, so click the Done button in the Field Name window. The Field Name window disappears, and the form window is displayed with these three fields in it (**Figure 1**).

Before we begin entering appointment information into this file, we need to adjust each field so that the file is as useful as possible. The file contains date and time information. By using the Set Field Attributes... command, we can tell Works that the Date and Time fields contain date and time information. This will allow us to sort these fields in chronological order, and it will let us specify certain formats for the dates and times we enter.

1. Click on the Date field to select it.
2. Choose the Set Field Attributes... command from the Format menu. The Set Field Attributes dialog box appears (**Figure 2**).



Calendar Works is excerpted from Works on the Apple Macintosh *by Charles Rubin, published by Microsoft Press, 16011 N.E. 36th Way, Box 97017, Redmond, Washington 98073-9717. Copyright 1986 by Charles Rubin.*

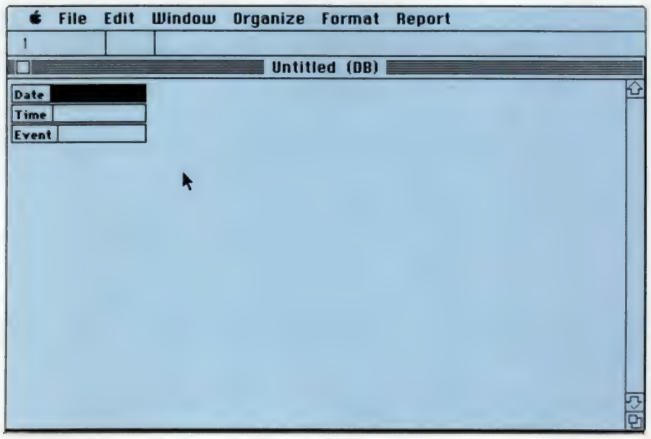


FIGURE 1: Date, Time and Event Fields

3. To tell Works that the Date field will contain date information, click the Date option in the Type area. When you do, the options in the Display area change to Short, Medium, and Long.

The Short, Medium, and Long options are three different formats in which Works can present dates. The formats look like this:

Format	*Example*
Short	3/24/86
Medium	Mar 24, 1986
Long	March 24, 1986

Since this is a calendar file, we'll want fairly descriptive dates, so we'll select the Medium option.

Click the Medium button.

You can also tell Works to calculate the day of the week for a date you enter and to display it along with the date in a field. You specify this format by clicking the Show Day box at the bottom of the Set Field Attributes dialog box. Works will display the day with a date only when you have selected either Medium or Long as the date format. When you click the box next to Show Day, the day will be displayed in the date format you have selected, as follows:

Format	*Example*
Medium	Mon, Mar 24, 1986
Long	Monday, March 24, 1986

Click the Show Day box.

The other options in the Set Field Attributes dialog box control how data is aligned in a field and whether or not the data is enhanced with underlining and other style options. The default alignment option is Left, meaning data is aligned with the left edge of data fields. Left alignment is fine for a calendar, so we don't need to change it. The only Style options available in this dialog box when you set the data type to Date are bold and underlining. Let's leave the Style options alone for now. (If you want to make data appear in boldface within a field, you can select Bold Field Data from the Format menu.) To confirm these field-attribute settings, either click the OK button in the lower-right corner of the dialog box or press the Return key.

The next field in the file will contain time data, so you'll want to set the field attributes for it as well:

1. Click on the Time field to select it, and then choose the Set Field Attributes... command from the Format menu.
2. Click the Time option in the Type area.
3. Press the Return key to confirm this change and return to the form window.

The third field will contain only text, and the default field data type is text; so we don't have to change this field's attributes. Now we're ready to enter some data into the file. Let's suppose Al has made an appointment with his dentist for 9:00 in the morning on March 24.

Click on the Date field to select it, and type **3/24/86**. Press the Return key. Works will automatically convert this entry to the Medium date format and display it in the window.

When you specify a certain data type for a field, Works expects you to enter that data in a particular format. Since we specified Date data for this field, Works will accept dates in any of these formats:

- 03/24/86
- 3-24-86
- 03/24/1986
- Mon, Mar 24, 1986
- Mar 24, 1986
- Mar 24, 86
- March 24, 1986
- March 24, 86
- Monday, March 24, 1986
- Monday, March 24, 86

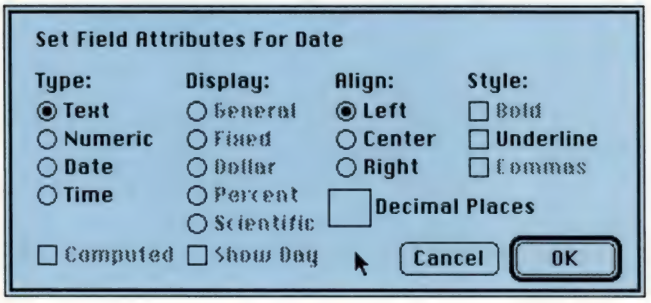
Works will convert any of these formats to the display format you selected in the Set Field Attributes dialog box.

When we enter this date in our first record, however, there's a problem: Works converts the date to the Medium format, but the field isn't wide enough to display the whole date. To see the entire date, we'll widen the field:

1. Place the pointer on the right edge of the Date field. The pointer changes to a double arrow.
2. Hold down the mouse button and drag the edge of the field to the right about three inches.
3. Release the mouse button. The entire date is displayed.

You can make any field wider or narrower at any time in the form window by dragging the field's right edge. While we're at it, we might as well widen the other two fields in this file:

FIGURE 2: Set Fields Attributes Dialog Box



1. Drag the right edge of the Time field about an inch to the right.
2. Drag the right edge of the Event field to the right edge of the screen. (This field will sometimes contain a lot of data, so you'll want all the room you can get.)
3. To enter the other two items of information, click on the Time field, enter **9:00**, and press Return. Works converts this entry to 9:00 AM and selects the Event field.

Works uses a 24-hour clock to convert times, so if you enter any time up to 12:00 without specifying either AM or PM, Works assumes you mean AM. To enter times after noon, you can either use military (24-hour clock) time or type *PM* after them. The best course is to specify AM or PM when you enter times.

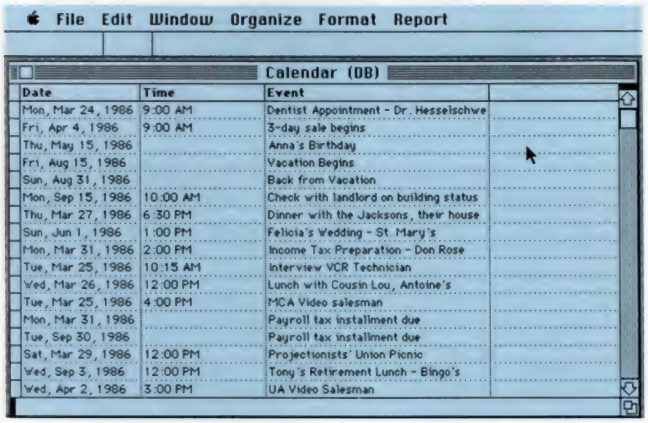

File Edit Window Organize Format Report
Calendar (DB)
Date | Time | Event
Mon, Mar 24, 1986 | 9:00 AM | Dentist Appointment - Dr. Hesselschwe
Fri, Apr 4, 1986 | 9:00 AM | 3-day sale begins
Thu, May 15, 1986 | | Anna's Birthday
Fri, Aug 15, 1986 | | Vacation Begins
Sun, Aug 31, 1986 | | Back from Vacation
Mon, Sep 15, 1986 | 10:00 AM | Check with landlord on building status
Thu, Mar 27, 1986 | 6:30 PM | Dinner with the Jacksons, their house
Sun, Jun 1, 1986 | 1:00 PM | Felicia's Wedding - St. Mary's
Mon, Mar 31, 1986 | 2:00 PM | Income Tax Preparation - Don Rose
Tue, Mar 25, 1986 | 10:15 AM | Interview VCR Technician
Wed, Mar 26, 1986 | 12:00 PM | Lunch with Cousin Lou, Antoine's
Tue, Mar 25, 1986 | 4:00 PM | MCA Video salesman
Mon, Mar 31, 1986 | | Payroll tax installment due
Tue, Sep 30, 1986 | | Payroll tax installment due
Sat, Mar 29, 1986 | 12:00 PM | Projectionists' Union Picnic
Wed, Sep 3, 1986 | 12:00 PM | Tony's Retirement Lunch - Bingo's
Wed, Apr 2, 1986 | 3:00 PM | UA Video Salesman

FIGURE 3: The List Window

Finally, you can enter the text describing the calendar event itself. The Event field should already be selected, so type:

Dentist Appointment-Dr. Hesselschwerdt, 12th & Broadway, 6th Floor.

Notice that this entry is longer than the space in the database's entry bar will allow. When you type more data than will fit in the entry bar, the entry bar expands to an extra line below.

You can enter up to 256 characters of data into any database field. The entry bar can expand to be up to three lines deep. When a data field is not wide enough to display an entry, Works still stores the entry (as long as 256 characters), but displays only what fits in the field. You can view the full entry by selecting the field and looking at the entry bar, where all the field's data is displayed.

Press the Return key to enter this data.

From here on, entering data into this file is simply a matter of typing in each appointment as we make it. For now, let's save the file with the name Calendar.

1. Choose the Save command from the File menu. A dialog box appears, prompting you to type a name for the new file.
2. Type the name **Calendar**, and then either click the Save button or press the Return key. The file will be saved to the current disk drive.

USING THE CALENDAR FILE

Now, let's assume that Al has made a couple of week's worth of appointments and entered them into the Calendar file. He entered the appointments as they were made, which means they weren't always entered in the order in which they will occur. Now he wants to see how his calendar shapes up for the next few months. To do that, he will want to look at a lot of appointments at once and then sort them chronologically.

The form window is showing because we were working with the form window when we saved the file. We want to see the list window, though, so double-click in a blank part of the form window. The display changes to the list window.

Double-clicking in a blank part of the screen is a fast way to change from the form window to the list window, and vice versa. Of course, you can also use Show Form or Show List from the Format menu to change displays, or you can press Command-L.

In a list window, the file looks like **Figure 3**.

Enter the rest of the appointments as shown.

With the list window showing, we can see that the appointments are out of order. We also notice that not very much of the first Event entry is visible, because the Event field is too narrow. So, before we sort the Event field, let's widen it.

1. Point to the vertical line that marks the right edge of the Event field. The pointer changes to a double arrow (**Figure 4**).
2. Hold down the mouse button and drag the line over to the right edge of the screen.
3. Release the mouse button to change the field width.

You can also make fields narrower by dragging dividing lines to the left.

Now that we can see more of the Event data, let's sort the file so the records are in chronological order by date.

1. Click on the Date field name to select that field.
2. Choose the Sort... command from the Organize menu. The Sort dialog box appears.

When you sort a Date- or Time-type field, the only options available are Chronological and Reverse Chronological. The Chronological option is the default, so it is selected.

Click the OK button or press the Return key. The records are sorted chronologically on the Date field.

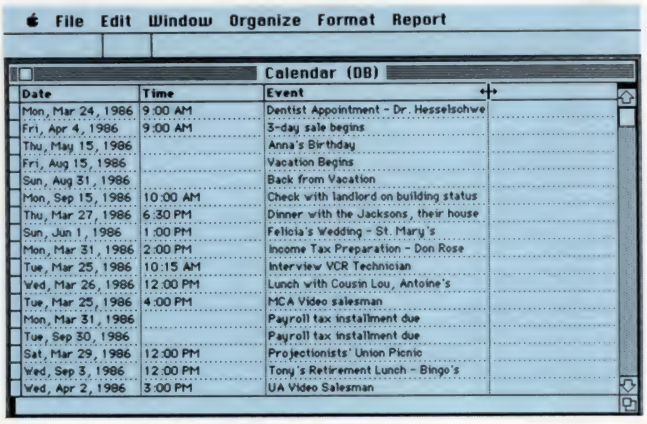
At this point, Al can scan the list window to see all his appointments on a certain date. There's still one problem, however. Works will only sort one database field at a time, and although we've sorted

You can also tell Works to calculate the day of the week for a date you enter and to display it along with the date in a field.

dates, some of the times within those dates aren't in chronologial order. For instance, on March 25 some of the times are out of order. To arrange the records so both fields are in chronological order by date and time, you have to sort the file twice — once by time and once by date.

1. Click the Time field name to select this field.
2. Choose the Sort... command from the Organize menu.
3. Press Return to select the default option to sort in chronologial order. The records will be sorted by time of day.
4. Click the Date field name to select this field.
5. Sort the Date field in chronological order. The records are now sorted by date, and within each date, they remain sorted by time.

FIGURE 4: Dragging Dividing Lines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Sun, Aug 31, 1986 | | Back from Vacation
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Sun, Jun 1, 1986 | 1:00 PM | Felicia's Wedding - St. Mary's
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Wed, Apr 2, 1986 | 3:00 PM | UA Video Salesman

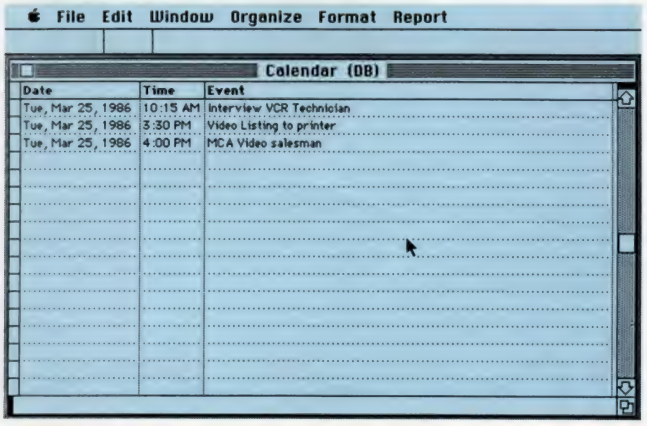

FIGURE 5: A Daily List of Appointments

Now these records are useful to look at in the list window. But it might also be handy to print out a report for a certain day so Al can carry a list of his daily appointments with him. Ordinarily, you would create a report format to print out selected records from a database file. But since there are only a few appointments in any given day on this calendar, you can do something a little simpler, especially since the file is already sorted in chronological order.

Before selecting the records, let's make the most of the screen space by making the Time field a little narrower and then widening the Event field again, using the same techniques we used to make the Event field its present size. That way, you can see all the Event data on the screen.

Drag the right border of the Time field to the left and the border of the Event field to the right.

Now, suppose we want to print out a list of Al's appointments for March 25. Here's what we do:

1. Choose the Match Records... command from the Organize menu. A dialog box appears.
2. Type the information you want to match (in this case, *Mar 25*).
3. The matching information you want Works to find is in a date field, and normally the Match Records... command searches all types of fields. (If you want to make certain that Works searches only text fields in the file, click the Search Text Fields Only box.)
4. Press the Return key or click the OK button. The records that contain the date *Mar 25* will be selected from the file and displayed on the screen (**Figure 5**).
5. To print them out quickly, select the Print Window command from the File menu. The records you selected, along with the field names, will be printed.

This is a quick way to print a few records from a database file. The Print Window command prints only records that are showing on the screen, so this option is suitable only when you are printing fewer than 18 records (the maximum number of records that can be displayed in a list window at one time). To redisplay all the records in a file, you have to choose the Show All Records command again. When you do, the check mark next to Match Records... on the Organize menu disappears, and all the file's records are displayed again.

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TIPS 'N TECHNIQUES

MULTI-VOICE SOUND CONTROL

Phase shift! Volume control! Tremolo! Gain full control over multi-voice sound on the Mac, with these interesting techniques.

The Macintosh has the best beep I've ever heard on any computer. After hearing it 10,000 times, however, I got a little tired of it. I tried to develop another beep to go with a "break" routine that handles Command-period. I wanted a beep that sounded more like a bell with a sound that slowly faded away instead of stopping instantly. However, my Macintosh has the Macintosh Plus ROMs, so it can't reproduce single-voice sound. (I tried it — and got the all-too-familiar dialog box telling me that the system dropped the Bomb on my program.) After much experimentation I discovered that you *can* control the volume from multi-voice sound. The seven demonstrations in the program presented here are the results of my efforts. They not only cover limited volume control but some interesting effects as well. (I have also included my break routine).

> With Microsoft BASIC, there is no provision for directly controlling the volume of multi-voice sounds.

Two Methods of Multi-Voice Sound

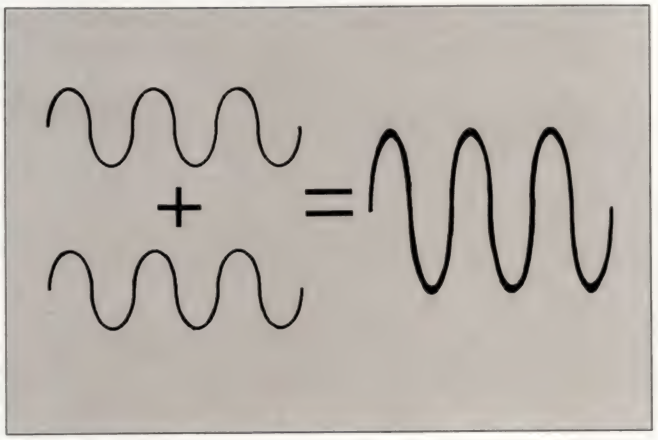
There are two ways to produce multi-voice sound. The first requires only one channel, and produces fair quality "pseudo" multi-voice sound. The other method requires special hardware to control each channel, and produces high-quality multi-voice sound. Fortunately, the Macintosh uses the latter method to produce sound. We will look at both in more detail.

by Scott Barta, 2175 East Messner Rd., Wooster, OH 44691. *This program compiles with the C, N, R options, using the Microsoft Basic Compiler 1.0.*

Method one is used by computers such as the Apple II to produce multi-voice sound. Since these computers are not equipped with sound synthesizers capable of producing two or more voices, the software must simulate the extra voices. This is done by switching rapidly between the desired sounds. If the switch is fast enough, it sounds like two separate sounds. For example, to create a chord of three notes, the software will play the first note for a small amount of time, then play the second, then the third, repeating the process many times a second. To the ear it sounds almost like a real chord. It is impossible, using this technique, to reproduce the special effects outlined in this article.

The second way requires special hardware but produces a higher quality sound. To produce sound this way, the hardware sums the waveforms of all of the input signals. In the Macintosh, the hardware takes the sound levels for each of the four channels and adds them together to produce one waveform that is the sum of its four

FIGURE 1: Constructive Interference



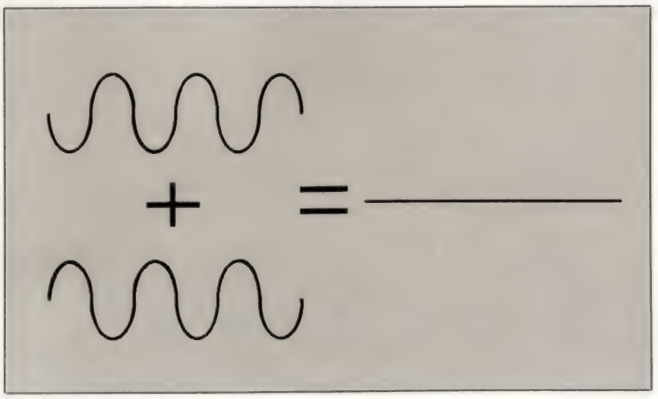


FIGURE 2: Destructive Interference

parts. This signal is then sent to the speaker. Producing multi-voice sound with this method resembles the way that sound works in nature.

VOLUME CONTROL

With Microsoft BASIC, there is no provision for directly controlling the volume of multi-voice sound. However, using some programming tricks, we can control the volume to a limited extent.

The first demonstration is an example of a phenomenon known as constructive interference. When two sounds of the same waveform are played at the same time, the resulting sound is louder than either of the two original sounds. In the Macintosh, this works as follows: in the program, two sine waves with the same frequency are played at the same time. As discussed earlier, the Mac adds the signal levels together to produce the final signal.

If we add the sine wave levels together, however, the resulting sine waves will have a larger amplitude than either of the individual sine waves. The positive peaks will be higher and the negative peaks will be lower. For example, if at one instant the level of both waveforms is +127, then the circuitry will add them together to get an output level of +254 (which may be clipped to keep it in range). If the levels of both waveforms are −128, then the levels will be added to produce a resulting level of −256. If you listen to the first demonstration, you'll notice that the first two sounds are a little softer than the third, the third being a combination of the first two. Using sound this way allows us to create sound levels louder than those available with single voice sound. Adding similar third and fourth voices should create even louder sounds. (*Note:* If you have the sound level set to the highest value in the Control Panel, you may not notice these effects.) See **Figure 1**.

The second demonstration shows another phenomenon known as destructive interference, which can also be used to control the volume of multi-voice sound. It works on the principle that two sine waves of the same frequency that are played 180° out of phase will cancel each other out, effectively producing no sound. If the second wave is played correctly, the crests (high points) in the first wave will correspond directly to the troughs (low points) in the other. **Figure 2** shows this effect pictorially. When the waves are added, the result is close to zero. In the second demonstration, two notes are played at the same time in the end, but no sound is generated. Another example is generated by demonstration 3. This sweeps through all of the possible phases of the second waveform. As the phase nears 128 (which translates to 180° out of phase), the sound level drops to nearly zero. As the phase increases, the volume increases, until the level is back to normal again. Using phase control on sine waves, you can have great control over the resulting volume. However, this method won't generate much success with non-sine waves.

Another phenomenon occurs when several different tones with slightly different frequencies are played at once. If the frequencies are a couple of hertz or less apart, the sound level periodically drops to nearly zero. These drops are called beats. The frequency of these beats is determined both by the frequency and frequency difference of the tones involved. This occurs when the crest on one tone matches the trough on the other. This effect lasts only a moment because the frequencies are unequal, and soon the crests on one waveform drift in relation to the troughs on the other and they no longer match. Periodically, the waves shift enough for opposites to match again, and there is silence. The best way to understand is to listen to demonstration 4. It uses one fundamental 1000 Hz tone and other tones of 1000.5, 1001, and 1002 Hz in separate demonstrations.

The frequency of these beats is determined both by the frequency and the frequency difference of the tones involved.

If the frequency of beats increases past about 12 beats per second, the ear perceives the beats as separate tones altogether. This effect is best understood by listening to demonstration 5. The program gradually increases the frequency of the beats until one cannot be distinguished from another, giving the effect of an undertone.

Demonstration 6 shows what happens if more than two different frequencies are mixed to create beats. Because there are many different frequencies, the beats are irregular.

The last demonstration is the break routine. The frequencies used to create the beep have been carefully selected so that destructive interference causes the sound level to decay to zero just before the sound stops.

ENTERING THE PROGRAM

To enter the program, use Microsoft BASIC 2.0 or higher (binary) and type in **Listing 1**. Macintosh Plus owners should use BASIC 2.1 or higher. Save it with the name Sound Physics. For help with entering *Nibble Mac* programs, see the directions in the Program Listings Section of this magazine.

SOME HINTS

If you plan to work very much with Macintosh sound, I strongly recommend that you add external speakers. Through the audio port in the back, the computer can be hooked up with a stereo or a home-built amplifier with speakers. Either method makes the computer sound 1,000% better. You do not need very fancy speakers. The ones I have are small 9 inch by 5 inch bookshelf speakers. In addition to sounding less muffled than the internal speaker, the external speakers also provide a better bass sound.

CONCLUSION

With these hints, you can now control the volume level of multi-voice sounds. Although it takes a lot of experimentation, the power to create complex sound effects is yours.

Acknowledgement: I would like to thank Richard B. Koehler for his help with some of the technical matters of this article.

Multi-Voice Sound Control listing starts on page 53

MAC UTILITIES

MENUMAKER

Writing the BASIC code for complex menus is a tedious process, especially if you want to do some fancy formatting. MenuMaker lets you lay out all your menus on the screen and then writes the code for you!

The Macintosh display is not just another pretty interface. There are brains behind the Mac look. Pull-down menus with fancy styling and automatic command key handling, like those in MacWrite and MacPaint, are easy to use, not easy to program. Programming BASIC's menu options, fancy fonts and type styles is no mean trick, either.

MenuMaker allows you to easily create formatted menus. Then it writes all the code for you, including GOSUBs and labels. All you have to do is insert your own program-specific code.

USING MENUMAKER

When you first start up MenuMaker, the screen is blank, except for the menu titles in the menu bar (labeled #1, Edit, #3, #4, #5, #6, #7, #8, #9 and MenuMaker), and a window at the bottom with the standard copyright message and instructions on changing the menu titles (**Figure 1**).

Menus 1 and 3-9 can be modified to suit your needs. The Edit menu (menu 2) is the standard BASIC edit menu with Cut, Copy and Paste options. The MenuMaker program does not let you change this menu, and you probably wouldn't want to because it's useful in almost any program you write. Nor can you change the MenuMaker menu, with its options for saving and quitting MenuMaker.

To add items to a particular menu, simply pull down the menu in question and select the Add an Item option. A dialog box will appear with: an edit field in which to type in the name of the menu item; another edit field for typing an optional command key character; three radio buttons for selecting whether the default status will be active, inactive, or selected; and six radio buttons for selecting the style in which the menu will appear. The other three buttons are the OK button, which should be pressed when the information is correct; Cancel, just in case you change your mind; and Make Bar, which will set up the buttons and fields for an inactive dotted line in the chosen menu position.

You can also perform other functions by choosing an option you have already created. Another dialog box appears, allowing you to cancel, insert an item before the chosen item, delete the chosen item, or change the information pertinent to this item.

Note: Once a menu item or title has been set as inactive, it will actually *not* be made inactive until the final code is saved. Therefore, it is possible to edit the menu item or title. To signify that a menu item will be inactive, a solid diamond character appears in front of it. The dash item (created with Make Bar), although not marked with a diamond, will *always* be inactive in your programs.

Certain restrictions are placed on menu items. Menu items can be no longer than 25 characters because of a limitation of BASIC. Menu titles are restricted to only five characters but you can change them to longer ones later. Make sure that your menu titles are not collectively so long that they push the MenuMaker menu (with its Save option) off the edge of the screen. If this happens, simply use shorter menu titles and change the appropriate DATA statements in the resultant BASIC program.

The MenuMaker menu contains four options. The last two allow you to exit the program to either BASIC, where you can work on your new program, or the Finder. The New option restarts the program, clearing the menus, so that you may start with a clean slate.

The real power of the program lies in the Save option. It translates your menus into the proper program code including:

1. An InitVariables section, where all variables are initialized.
2. A MenuEvent section, which contains all of the proper GOSUBs to route program flow to your own special routines.
3. A MenuSetup section, where the menus are read from data and placed in the menu bar.
4. A Setup subprogram, which accesses the Toolbox routines used by this program.

Syntax is not checked, so it's up to you to know that a menu item like OPEN is not valid (it is a BASIC keyword).

Keep in mind a few other things as you use MenuMaker. For one, the program does not check to see if you have used the same command key twice. In addition, refrain from using X, C or V as these are used in BASIC's Edit menu.

by Ian McLellan, McPrograms, 535 Appledale Crescent, Waterloo, Ontario, Canada N2J 3Z5. *MenuMaker is not compatible with the Microsoft BASIC compiler 1.0.*

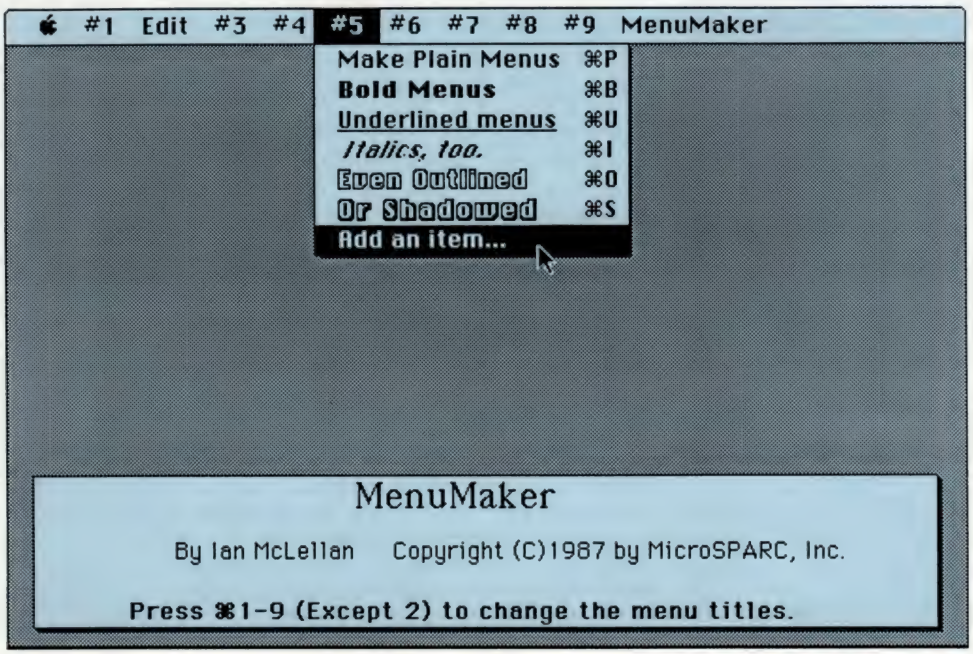

#1 Edit #3 #4 #5 #6 #7 #8 #9 MenuMaker
Make Plain Menus ⌘P
Bold Menus ⌘B
Underlined menus ⌘U
Italics, too. ⌘I
Even Outlined ⌘O
Or Shadowed ⌘S
Add an item...
MenuMaker
By Ian McLellan Copyright (C)1987 by MicroSPARC, Inc.
Press ⌘1-9 (Except 2) to change the menu titles.

FIGURE 1: MenuMaker Display

ENTERING MENUMAKER

MenuMaker runs on a 128K Macintosh with Microsoft BASIC (version 2.0 or higher, binary). Macintosh Plus owners should use version 2.1 or higher. To enter the program, type in **Listing 1**, and save it as MenuMaker *before running it*. As this program uses the Macintosh Toolbox, some spectacular crashes are possible, so until you are sure you have the program typed in correctly, *caution* is the keyword.

For help with entering *Nibble Mac* programs, see the Program Listings Section of this magazine.

CHANGING YOUR NEW MENUS

Changing your new menus from within your program is not quite as easy as changing your normal BASIC menus. Outlined below are the three most frequently used routines.

Changing an Item

Suppose that you want to change an item from "Show Title" to "Hide Title". First, you must access the menu's *handle*. This is a pointer with which the Mac refers to a menu. If you do not get the handle, the Mac may try to access something different, resulting in a system crash. Then you must call the SetItem routine in the Toolbox. If you need this capability, add the following code to the program created by MenuMaker (preferably at the end).

```
SetItem:
     CALL Setup(&HA949,Long)
     CALL ToolBox!(LongReturn!,M+1)
     GOSUB AdjustLong
     Handle!=LongReturn!
     CALL Setup(&HA947,Nil)
     CALL ToolBox!(Handle!,I,I$)
RETURN
```

Now when you want to change an item, simply set M to the number of the menu to change, I to the item number to change, and I$ to the new text for the menu item.

Checking/Unchecking Items

Checking and unchecking follows much the same format, except a different Toolbox routine is called. Add the code:

```
CheckItem:
     CALL Setup(&HA949,Long)
     CALL ToolBox!(LongReturn!,M+1)
     GOSUB AdjustLong
     Handle!=LongReturn
     CALL Setup(&HA945,Nil)
     CALL ToolBox!(Handle!,I,S)
RETURN
```

To check an item, set M and I as above, but let S equal 255. To uncheck an item, again set M and I as above, only this time let S equal zero. In both cases, M is the menu number and I is the item number.

Enabling/Disabling Items

To enable or disable items, use this code:

```
ChangeStatus:
     CALL Setup(&HA949,Long)
     CALL ToolBox!(LongReturn!,M+1)
     GOSUB AdjustLong
     Handle!=LongReturn!
     IF S=0 THEN Trap=&HA93A ELSE Trap=&HA939
     CALL Setup(Trap,Nil)
     CALL ToolBox!(Handle!,I)
RETURN
```

To enable an item, let S equal one. To disable an item, let S equal zero. In both cases, make M and I the menu and item numbers, respectively.

THE INNER WORKINGS

Listing 1 starts with TitleWindow, which displays the copyright messages. Next, VarSetup sets all variables to integer, initializes the necessary arrays, and sets up the important Toolbox variables. It then sets up menus 1 and 3-9, as well as the MenuMaker menu. The Edit menu is left standard.

Program flow moves to the idle routine. Here, the keyboard is checked to see if Command-1 through Command-9 are being pressed. Any command keys in menus are handled by the Macintosh, and all others are ignored. If a Command-number combina-

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tion is pressed, the subprogram GetTitle is called to get the new menu title.

All menu events are handled starting with the line labelled MenuEvent. Whenever you select the Add an Item option, the program jumps to AddItem where the new item is added, unless Cancel was pressed. The AlterItem routine creates the options to edit, delete, or insert around the item you chose, going to the appropriate routine.

Starting at the label MenuMakerMenus, all of the program's menu choices are handled. NewSet asks for confirmation before clearing the menu bar, if the menus have been changed.

The bulk of the program is in the SaveSet section. It is here that all of the menu items you have created and stored in arrays are combined in a coherent way to be used as the shell of your next program. The rather long routine simply finds which menus have items in them, creates GOSUBs for each menu, and creates the GOSUBs for each individual item, always providing the proper RETURN statements. The data statements that contain the text of the menu items are also created.

At various points in the Save routines are remarks such as "Add part 1 of program code." At these places, instructions are read from DATA statements and added to your BASIC program. These statements are essential to get your program working, so do not tamper with them.

Both QUITs are handled at exactly the same place: at the Quit routine. If the program has been changed, you are asked if you want to save. If you do, the menus are saved; otherwise, you end up in BASIC or the Finder, depending on your choice.

Listing 1 contains some handy subprograms. One of my favorites is Outline. The CALL statement used to access it is almost the same as a BUTTON statement; however, this routine also outlines the button, so that it becomes obvious what button will be used if you press Return.

The next subroutine, BuildMenu, builds up the new menus as fast as you can change them. Some code similar to this is found in the program created by the Save command, but here only one menu is built at a time.

The SetWatchCursor subprogram does exactly what its name implies.

The AlphaOnly subprogram takes a string called in$, removes all characters that are not letters, and places the result in out$. It is useful for removing undesired characters from strings brought in from edit fields.

The rest of the program, from the Setup subprogram to the end, was presented in the article "Nibbling at MS BASIC Menus" by Bruce R. Land (*Nibble Mac* Vol. 1/No. 6). Through these routines, it is possible to have all of your styling and command characters handled by the Macintosh, as they access the Toolbox. When typing these in, be *very* careful. Read the aforementioned article for a thorough description of these routines.

MODIFICATIONS AND ENHANCEMENTS

Although MenuMaker contains a handy change option, and Insert and Delete can cancel each other out, you may want to take the time to add an Undo option.

Another useful addition would be a routine that checks to see if the same command key character is used more than once. Keep in mind, though, that the program already runs slowly at times, so a search through all of the key characters may take up more time than it's worth.

A great hint for writing BASIC programs is to use MenuMaker in conjunction with other programs that create BASIC code, like "Window Dresser" by David Krathwohl (*Nibble* Vol. 6/No. 7). Together, these will write the better part of the code. They can speed up your program writing tremendously!

MenuMaker listings start on page 54

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THE KEY OF C, PART IV

CURSOR HATCHING

In this installment, Jan shows you how to create and manipulate cursors in C, and presents the first part of a cursor editing program.

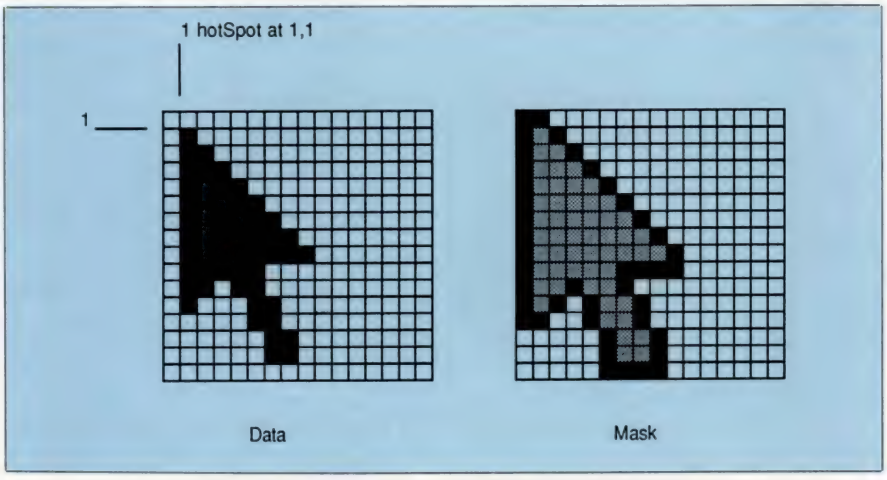
by Jan G. Eugenides, P.O. Box 151, Maynard, MA 01754

One of the most noticeable differences between the Macintosh and other computers is its use of an on-screen pointer, called a cursor, controlled by the mouse. The first time I saw a Macintosh (seems like a *long* time ago) I was entranced by the way the arrow seemed to float above everything else on the screen. Nowadays, more and more computers are incorporating similar mouse-controlled cursors, and for good reason; using one is as easy as pointing.

In this installment of The Key of C, we'll study the Macintosh cursor in detail, and you'll discover how to design your own. The program this month is called CursorHatcher (**Listing 1**), and with it you can explore the visual results of various cursors the easy Macintosh way — by drawing them. CursorHatcher is the first part of a two-part program. Part 2 will be presented in my next column. The finished program will be most useful to you, and will be capable of creating cursor resources (CURS) that are compatible with any Macintosh language, including C, BASIC, Pascal and assembly language.

This is the fourth lesson of a series. It is not necessary for you to understand what has gone before to use the program presented in this lesson. However, you may have trouble understanding some of the technical aspects if you are just joining us. If so, just get copies of the last three columns and start at the beginning.

FIGURE 1: Cursor Images



This article has two sections, as usual. The first section explains the workings of the various Macintosh Toolbox routines that are used in **Listing 1**. The second section, titled C Things In Depth, focuses on the C language itself.

The program this month is a complete, stand-alone application, with menus and desk accessory support. Since I explained the overall structure of an application in the last installment, I won't be rehashing any of that this time. Instead, I'll focus on the routines that are specific to this program. But before we get into them, it will be helpful to understand how cursors are defined on the Macintosh.

CURSOR STRUCTURE

The cursor you see on the screen is simply a pattern of black and white pixels (dots). It actually consists of two images: the cursor image itself, and a mask that determines how the background is treated. In order to draw the cursor, the Macintosh requires some data set up in the proper format. This is accomplished most easily by using a data structure called a Cursor. The Cursor structure is defined as follows:

```
typedef struct
{
int     data[16];
int     mask[16];
Point   hotSpot;
} Cursor;
```

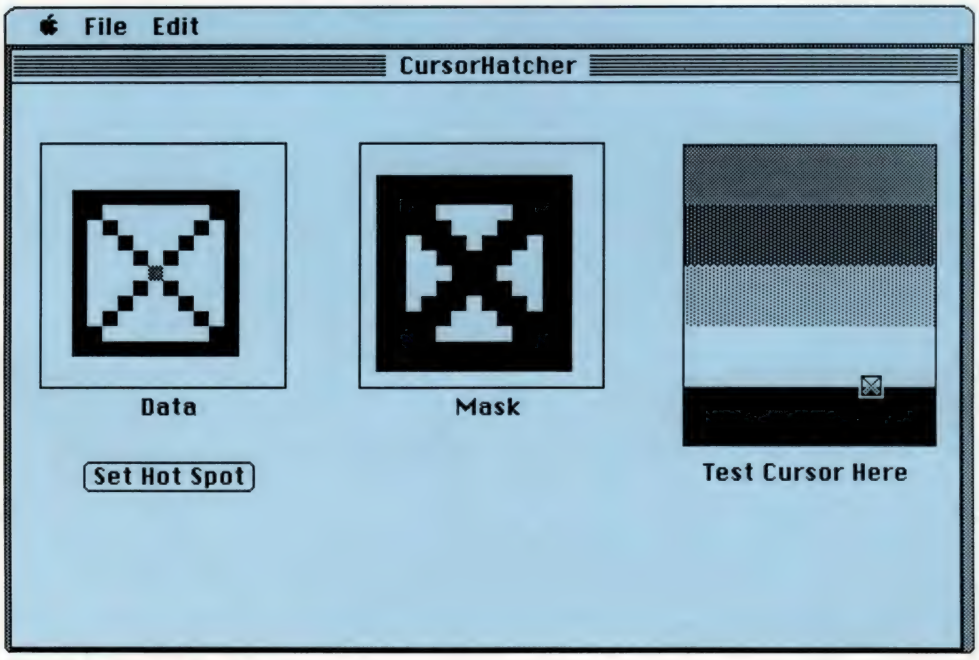


FIGURE 2: Screen Display

A Cursor, then, is comprised of two arrays of sixteen integers each, and one Point (arrays are discussed in detail in the C Things in Depth section of this article). The first array contains the data that describes the cursor itself, and the second array contains the data for the cursor mask. The cursor data determines the shape of the cursor on the screen. The mask data determines how the background will be displayed as the cursor passes over it.

The cursor appears as a 16 × 16 bit square on the screen; each bit corresponds to one pixel. Thus, because an integer has 16 bits, each integer in each array corresponds to one row of the square (see **Figure 1**). **Table 1** shows how the data bits, mask bits and screen bits are combined to create the final appearance of the cursor on the screen. By properly designing the data and mask, you can create cursors that are completely transparent, or that invert the background. Usually, the idea is to create a cursor that looks essentially the same, regardless of the background.

The last part of the cursor is a Point, called the hotSpot, that determines which part of the cursor is aligned with the mouse location. In **Figure 1**, the arrow cursor has its hotSpot aligned with the tip of the arrow. This results in a very natural feel, since the user would normally point with the tip of the arrow. If, instead, the hotSpot were defined as the lower end of the arrow stem, the cursor would be difficult to use because it wouldn't seem to be pointing where you aimed it. Selection of the hotSpot is very important to the usefulness of the cursor.

By properly designing the data and mask, you can create cursors that are completely transparent, or that invert the background.

DESIGNING A CURSOR

To design a cursor manually, you would set up a 16 × 16 grid, and fill in the squares as necessary to create the cursor shape you want. Then you would translate each line of the grid into a binary integer by writing zeros for the empty squares and ones for the filled squares. The result would be 16 zeroes and ones, an integer value. You would do this 32 times, 16 for the cursor and 16 for the mask. Then, you would type it all into a program designed to display the cursor.

Forget it. Real programmers don't use grid paper. Let's write a program to do it, instead!

USING THE PROGRAM

Listing 1 contains an easy-to-use, graphics oriented cursor editor (see **Figure 2**). You can use the program to experiment with some of the cursor concepts you've just learned. Start it up by double-clicking its icon. A screen like that in **Figure 2** is displayed, but with empty squares for the data and mask. Use the mouse to draw a cursor in the Data square. This is similar to using FatBits in MacPaint. As you work, you can move the cursor over the patterns labeled "Test Cursor Here." When you do, the cursor will change from the normal arrow to your new design, so you can instantly see the effect of each change. Selecting Data-> Mask from the File menu will duplicate in the Mask square whatever is in the Data square. This makes it easy to create a mask from the original cursor data. Selecting Clear from the Edit menu will completely erase both the Data and the Mask, and allow you to start again.

To set the hotSpot for the cursor, click on the Set Hot Spot button, and then click in the Data square where you want the hotSpot to be. It is drawn as a gray square so you can easily see where it is. By moving the cursor back and forth over the borders of the test pattern area, you can see the effect of changing the hotSpot.

The Save Cursor option in the File menu is not functional yet. In the next installment

continued on next page

of The Key of C, I'll be discussing resources and we'll add the save function to this program then.

ENTERING THE PROGRAM

To enter CursorHatcher (**Listing 1**) in LightspeedC, create a new project and add the MacTraps library to it. Then create a new document, type in **Listing 1** as shown (you can skip the comments), save it as CursorHatcher.c, and add it to the project. Remember to add full pathnames to the header files if you are using HFS with version 1.02 of the compiler. Finally, select Build Application from the Project menu to create the finished application.

If you are not using LightspeedC, you must consult your owners manual for the exact steps necessary to create an application. They are different for every system. In addition, you will have to make some minor changes to the listing to adjust to your compiler's syntax. In particular, you must change the names of the included header files to match the ones that come with your system. If your system defines any of the standard data structures differently than *Inside Macintosh*, you may have to make changes to some of the function calls as well.

HOW IT WORKS

I have commented the listing, so you can follow the flow easily. Like all good Macintosh programs, it is event driven. Remember that execution of a C program begins with the main() function.

You already know a lot of the Toolbox functions used in the program. You know how to set the pen pattern. You know how to create rectangles and fill them with a pattern. You know about handling menu events and drawing in a window. In fact, there are only a handful of new Toolbox functions needed for this program — the one for displaying alternate cursors, a couple for enabling and disabling menus, and a couple for dealing with pushbuttons. See how far you've come in three lessons?

A couple of other things you haven't seen before are the arrays of rectangles used for the data and mask grids, and the bitwise OR function used to create the actual cursor data from the grids. These are explained more fully in the C Things In Depth section.

NEW TOOLBOX FUNCTIONS

The Toolbox function that allows you to display alternate cursors is called SetCursor(), and is defined as follows:

```
void SetCursor(cursor)
Cursor *cursor;
```

The only parameter it needs is a pointer to a Cursor data structure in memory. It immediately changes the cursor to the new shape, and the cursor remains that shape until changed by another SetCursor() or InitCursor().

TABLE 1: Combining Data, Mask and Screen Bits

Data Bit	Mask Bit	Resulting Pixel On Screen
0	1	White
1	1	Black
0	0	Same as screen pixel
1	0	Inverse of screen pixel

Another new Toolbox function is PtInRect(). It determines if a given point is contained within a given rectangle. It is defined as:

```
Boolean PtInRect(pt,r)
Point pt;
Rect *r;
```

It returns a Boolean (true/false) value; true if the point is contained in the rectangle, and false if it is not.

There are four Toolbox functions related to buttons used in **Listing 1**. They are NewControl, TrackControl, HiliteControl, and DrawControls. Here are their definitions.

```
ControlHandle NewControl
 (curWindow,boundsRect,title,
 visible,value,min,max,contrlProc,
 refCon)
WindowPtr    curWindow
Rect         *boundsRect;
char         title[256];
Boolean      visible;
int          value;
int          min,max;
int          contrlProc;
long         refCon;
```

NewControl is the most complex of the four, and is used for creating controls of many types, including pushbuttons, radiobuttons, scrollbars and others. **Listing 1** uses it to create one pushbutton (see the main() function).

CurWindow is the window in which the control will appear. BoundsRect is the rectangle that encloses the control, including its title, in local window coordinates. Title is the text that appears in the control, or next to it, depending on what type of control it is. It must be a Pascal string. The Boolean visible determines whether the control will actually be drawn or not. Value is the control's initial value (for pushbuttons, the value can be zero or one). Min and max are the control's minimum and maximum values, respectively. The contrlProc identifies the type of control being created. CursorHatcher uses the predefined constant pushButProc to create a pushbutton. The refCon is a storage area that your program can use for whatever purpose may be necessary. CursorHatcher does not use the refCon.

```
int TrackControl(theControl,
 thePt, actionProc)
ControlHandle theControl;
Point         thePt;
ProcPtr       actionProc;
```

TrackControl should be called whenever the mouse is clicked in a control of some kind. It handles all necessary tracking of the mouse movement and highlighting of the control. It returns a zero if the mouse is released outside the control. Otherwise it returns the part number of the control in which the mouse is released. Pushbuttons have only one part, so as used in CursorHatcher (in the DoButton() routine), TrackControl returns either a one or a zero.

```
void HiliteControl(theControl,
 hiliteState)
ControlHandle theControl;
int           hiliteState;
```

HiliteControl is used to alter the appearance of a control. There are three values of hiliteState normally used for a pushbutton: 0, 1, and 255. A zero causes the pushbutton to assume its normal, unselected appearance. A one causes the button to be highlighted (drawn in inverse). The final value, 255, causes the button to appear dimmed.

```
void DrawControls(theWindow)
WindowPtr theWindow;
```

This handy routine draws all the controls in the given window. It is used in CursorHatcher as part of the DoUpdate function, which draws the contents of the window. CursorHatcher has only one pushbutton, but a single call to DrawControls would be sufficient even if there were many different types of controls in the window.

```
void EnableItem(menu,item)
MenuHandle menu;
int        item;
```

This function enables the given item in the given menu, and redraws it to indicate that it is available. If item is zero, the entire menu is enabled (individual items may remain disabled).

```
void DisableItem(menu,item)
MenuHandle menu;
int        item;
```

This function disables the given item in the given menu, and dims it to indicate that it cannot be selected. If item is zero, the entire menu is disabled.

THE PROGRAM FLOW

Now that you understand what most of the ROM calls do, let's take a little closer look

TABLE 2: How Bits Combine Using OR

If y bit is:	And z bit is:	The result is:
0	0	0
1	0	1
0	1	1
1	1	1

at CursorHatcher itself (Listing 1). It begins, as usual, with some included header files and a few simple definitions.

There are five arrays defined as global variables (arrays are explained in the C Things In Depth section). The first is an array of four MenuHandles called, naturally enough, menuHandles[ ]. Then there are two arrays of Rects, both with 256 elements: gridRect1[ ] and gridRect2[ ]. Finally, there are two arrays of ints, also with 256 elements: gridBits1[ ] and gridBits2[ ].

In the main( ) function, the 256 rectangles in gridRect1 and gridRect2 are initialized to contain the locations of each "fatbit" (grid position) that can be drawn in the Data square and Mask square respectively. Then, when the mouse is clicked, it is easy to use PtInRect( ) in a loop to determine which grid position was clicked on. In CursorHatcher, this occurs in the HandleMouse( ) function, as well as other places.

The two integer arrays, gridBits1[ ] and gridBits2[ ] are used to contain the on/off status of each of the grid positions; gridBits1[ ] corresponds to the Data grid and gridBits2[ ] corresponds to the Mask grid. Whenever a grid position is toggled on or off, these arrays are updated. Then, when it comes time to display the new cursor design, the data in these two arrays is used to fill in the necessary Cursor data structure, which is then passed to the SetCursor( ) Toolbox function for display.

The SetCurs( ) function in CursorHatcher takes care of changing the cursor to the new design whenever it moves over the test patterns, and changing it back to an arrow the rest of the time. It calls the MakeCursor( ) routine to create a Cursor data structure from the data in the two gridBits[ ] arrays. MakeCursor( ) in turn calls two other functions, Combine1Bits( ) and Combine2Bits( ) that each take 16 elements from the corresponding gridBits[ ] array, and turn them into one 16-bit integer. This is done by using the bitwise OR operator (|) to set each bit of the new integer according to the value of the gridBits[ ] element (the bitwise OR is explained in the C Things in Depth section). Each integer thus created is set in place in the Cursor data structure, and finally passed to SetCursor( ) by the SetCurs( ) function.

The SetHot( ) function is invoked when the user clicks on the Set Hot Spot button (see **Figure 2**). It dims the menus and the button, and then waits for a mouseDown event to take place. PtInRect( ) is then called to determine which grid rectangle was clicked, and that rectangle is then filled with a gray pattern. If the mouse was not clicked anywhere in the cursor grid, the hotSpot is left unchanged.

TransGrids( ) simply copies all the data in the cursor grid (gridBits1[ ]) into the mask grid (gridBits2[ ]), and redraws the mask grid as it does. ClearCursor( ) sets both grids to all zeroes and clears the screen.

LineORects( ) is called several times as part of the program's initialization. It calculates a row of rectangles for each of the two grids, and fills the gridRect[ ] arrays with the calculated values. Once they've been calculated, they are available to all the functions in the program.

The main( ) function is a standard routine quite similar to the one I presented last time. The DoUpdate( ) function is responsible for drawing everything on the screen. It is important to notice that almost no drawing is done anywhere else in the program, with the exception of the routines that toggle individual grid rectangles. The general rule of thumb is "Don't draw anything in the window except in response to an update event." The exception to the rule is while the mouse is being held down (since no update events can get through during that period). Actually, this is a rule made to be broken, and every program will require some judgement on your part, but if you start with the idea of doing all the drawing in your update function, you'll have a much easier time structuring your programs.

C Things in Depth

I promised you last time that I would explain arrays, and CursorHatcher uses quite a few of them, so this is as good a time as any. An array in C is very similar to an array in BASIC, with a couple of interesting differences. First, like all C variables, an array must be declared before it is used in the program. The general syntax for array declarations is:

```
type arrayname[size];
```

where type is the type of objects in the array (e.g., int, long, Handle, etc.), arrayname is the name you want to use for the array, and size is the number of elements in the array.

Whereas in BASIC you are restricted to only a few array types, such as integer arrays and string arrays, in C you can have arrays of any kind of object, including complex data structures. You can even have arrays of arrays. This is a very powerful feature of C, and allows many complex manipulations of data.

As in BASIC, the first element in an array is numbered zero. Therefore, a 256-element array has 256 elements numbered 0-255. Unlike BASIC, C does no bounds checking, and will not generate an error message if you attempt to use element 257, or even element 500, of a 256-element array. It will simply overwrite whatever occupies the memory location that element would normally occupy if it existed. It is up to you to keep track of your array limits. Failure to do so can result in very difficult-to-trace problems, as random parts of your program or variables get overwritten.

Each element of the array is accessed by its number, just as in BASIC, so to access the fifth element of the array arrayname[ ], you would write arrayname[4] (remember to start counting from zero).

BITWISE OR

C has some powerful features for directly manipulating bits. CursorHatcher uses the bitwise OR to construct the bytes of the Cursor data structure from the integer arrays, gridBits1[ ] and gridBits2[ ]. The syntax for the bitwise OR is:

```
x = y | z;
```

If x, y and z are all integers, then they each have 16 bits. For each of the 16 bits, if either y or z has that bit set (1), the corresponding bit in x will be set. If both y and z have that bit cleared (0) the bit in x will be cleared. **Table 2** shows how the bits combine.

NEXT TIME

Next time we'll study resources in more depth, and I'll show you how to create and use them in your own programs. We'll add a routine to CursorHatcher that allows you to save the cursors you create as resources, so you can use them in other programs (C, Basic, Pascal, or whatever!).

Before then, you should call your local user's group or information service (such as Delphi or CompuServe) and get yourself a copy of ResEdit, Apple's resource editor. You will need it next time. It's powerful and it's free. LightspeedC owners have a copy of ResEdit already, on the Utilities disk, LS.3.

Cursor Hatching listing begins on page 61

ENTERING *NIBBLE MAC* PROGRAMS

Entering *Nibble Mac* programs is as easy as using MacWrite. If you can write a letter on your Macintosh, you can enter a *Nibble Mac* program. It's a great source of inexpensive software, and you just might learn a few things while you're at it.

The programs in *Nibble Mac* may be written in one of several computer languages: BASIC, C, Pascal, or assembly language. To enter programs in any of these languages, you will need to own the appropriate language software. Each program's article indicates the language and system needed for that program.

We also publish templates for Excel, Works, Jazz, and other spreadsheet and database management software. Naturally, you must own the corresponding program in order to put these templates to use.

The majority of programs that appear in *Nibble Mac* are written in Microsoft (MS) BASIC. A detailed description of how to enter programs in that language follows. For programs in other languages and spreadsheet/database templates, see the Entering the Program section of the corresponding article.

GETTING STARTED WITH MS BASIC

To begin, turn on your Macintosh, and insert your copy of the MS BASIC disk. There are two versions of MS BASIC on the disk, a decimal version and a binary version. The icon for the decimal version has a dollar sign ($) and the icon for the binary version has a pi symbol (π). The decimal version uses math routines that are well suited to monetary calculations. The binary version uses math routines that are better suited to precise floating-point calculations. The only difference between the two versions is their math routines.

There have been a number of upgrades to MS BASIC during the past two years. The current version is 3.0, and it is highly recommended that you upgrade to this version. It includes a number of new commands and features. Also, versions prior to 3.0 do not work properly with the Hierarchical File System (HFS) now in use on most Macintoshes (particularly those with hard disks).

Each MS BASIC program in *Nibble Mac* specifies the version of BASIC you should use to enter it at both the top of the program listing and in the Entering the Program section of the article. Be sure you use the correct version.

Once you have determined which version to use, double-click on its icon to start MS BASIC. You are presented with three windows: a List window, a Command window, and an Output window. The List window is the active window when you first start MS BASIC, and the one into which you should type the program.

ENTERING THE PROGRAM

Entering the program is simply a matter of typing it into the List window exactly as it appears in the magazine listing. The standard Macintosh editing functions (cut, copy, paste) are available. Be extra careful as you enter the program — one typing error can cause the program to run incorrectly, or not at all.

As you type in the program, be sure not to press the Return key until you reach the end of the line, even if it is wider than the screen display. The window will scroll horizontally as you type long lines.

> **An Important Note** — Whenever a program line is too long to be printed in one magazine column, it is continued on the line below. When this happens, two solid arrows (►►) are used to indicate the continuation. Don't attempt to enter the two solid arrows. They are just markers to help you type in the program. Keep typing as if it were all on one very long line, and press Return only at the end.

As you enter the program, be sure to save it every 5 or 10 minutes by using the Save option of the File menu. This minimizes your loss in case you lose power to the Mac. It is also important to save the program before you run it.

RUNNING THE PROGRAM

When you have finished entering the program, and have double-checked it for accuracy, save the final version. Select Start from the Run menu to run the program. Most typing errors cause your program to stop and display both an error message and the line in which the error occurred. Usually, this is the line that contains the typing error. In some cases, however, the typing error may be in a previously executed line. (Since program flow can be re-routed by such statements as GOTO and GOSUB, this line may or may not actually precede the line in which the error occurred.)

THE MS BASIC COMPILER

All MS BASIC programs published in *Nibble Mac* are tested for compatibility with the MS BASIC Compiler. Unless otherwise noted, programs will compile successfully, and the compiler options you should use are listed at the beginning of each article.

WHERE TO FIND THE LISTINGS

Painter ..... page 49
Multi-Voice Sound Control ..... page 53
MenuMaker ..... page 54
Cursor Hatching ..... page 61

WE SUPPORT YOU

Nibble Mac has a unique support system to make sure that you are able to type in your programs correctly. First, each program is thoroughly tested before publication. Second, each article contains complete directions for entering and saving the programs. Third, the Nibble Mac Hot Line (see below) is available 24 hours a day to report errata and offer tips. Finally, we offer technical assistance by mail or phone.

Here are some answers to the questions we are most often asked, and some tips that will make typing *Nibble Mac* programs even easier:

ERROR TRAPS

Some programs have error traps that perform a necessary function. Unfortunately, these traps will also "catch" typing errors. Until you're sure you have typed the program correctly, you may want to eliminate lines that contain the statement ON ERROR GOTO *nn*.

DATA STATEMENTS

Be particularly careful when typing program lines that contain the word DATA. Typos in other lines will probably cause error messages when the program is run, but those in DATA statements may not.

PROGRAM MODIFICATIONS

Don't try to make your own modifications to the program until you have typed it in as published and have run it successfully. Make your modifications to a copy, only.

READING ALOUD

One good way to check your typing is to have a friend read the published listing to you while you check your typed version against it. Alternatively, you can use a tape recorder to record yourself reading the published listing and then play it back as you check your typing.

NIBBLE MAC HOT LINE

If you have a 300 or 1200 baud modem, you can call the Nibble Mac Hot Line at (617) 369-8920 to receive the latest errata notices, download a one-liner, or order a *Nibble Mac*/MicroSPARC product. Set your communications software at 8 data bits, 1 stop bit, no parity, full duplex. The Hot Line will automatically determine the correct baud rate.

TECHNICAL SUPPORT

If you run into a problem you can't solve, write or call *Nibble Mac* Technical Support, 52 Domino Dr., Concord, MA 01742, (617) 371-1660.

PAINTER
Article on page 14

THIS PROGRAM IS AVAILABLE ON DISK

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. Painter, Multi-Voice Sound Control, CursorHatcher and MenuMaker are available on diskette for an introductory price of $19.95 plus $1.50 shipping/handling ($2.50 outside the U.S.) from Nibble Mac, 45 Winthrop St., Concord, MA 01742. Introductory price expires 6/30/87. See the Software Catalog in this issue for ordering information.

Listing 1 for Painter

PAINTER

```
' Painter
' by Mike Linkovich
' Copyright 1987 by MicroSPARC, Inc.
' Concord, MA  01742
' MS Basic version 2.0 (b) or higher
' Macintosh Plus owners should use
' version 2.1 or higher

DEFINT A-Z
Startup:
    RANDOMIZE TIMER
    WINDOW 1,"",(11,30)-(499,332),4
    Patn=4:Px=10:Py=10:Tool=1:c=0:B=0:E=0
    x=0:y=0:R=6:Act=0:itemID=0:MenuID=0:G$=""
    theSize = 8:White = 0
    DIM Pat(19),Pic!(6000),B(5),RPat(5),Set(10)
    DIM CrsXOR(33),CrsPat(33),CrsDry(33)
    FOR c=1 TO 5:B(c)=2 : RPat(c)=c-1:NEXT
    FOR c=1 TO 10:READ Set(c):NEXT
    FOR c=0 TO 33:READ CrsXOR(c):NEXT
    FOR c=0 TO 33:READ CrsPat(c):NEXT
    FOR c=0 TO 33:READ CrsDry(c):NEXT
    FOR c=0 TO 3
        Pat(c)=0
        Pat(c+4)=17425
        Pat(c+8)=21930
        Pat(c+12)=-17426
        Pat(c+16)=-1
    NEXT
    MENU 1,0,1,"File"
    MENU 1,1,1,"Erase Screen"
    MENU 1,2,1,"Open..."
    MENU 1,3,1,"Save As..."
    MENU 1,4,1,"Print"
    MENU 1,5,1,"Save on Clipboard"
    MENU 1,6,1,"Quit to BASIC"
    MENU 1,7,1,"Quit to Finder"
    MENU 2,0,1,"Options"
    MENU 2,1,1,"Drybrush"
    MENU 2,2,1,"Pattern Paint"
    MENU 2,3,1,"Invert Paint"
    MENU 3,0,1,"Pen"
    MENU 3,1,1,"White"
    MENU 3,2,1,"Light Grey"
    MENU 3,3,1,"Medium Grey"
    MENU 3,4,1,"Dark Grey"
    MENU 3,5,2,"Black"
    MENU 3,6,0,"-"
    MENU 3,7,1,"Small"
    MENU 3,8,2,"Medium"
    MENU 3,9,1,"Large"
    MENU 4,0,1,"Settings"
    MENU 4,1,1,"Drybrush variable..."
    MENU 4,2,1,"Patterns..."
    MENU 4,3,1,"Pen sizes..."
    MENU 5,0,0,""
    GOSUB TitleScreen

ON MENU GOSUB MenuFix : MENU ON
TEXTFONT 0
GOSUB DryBrush1

Paint:
    WHILE MOUSE(0)=0
        IF DIALOG(0)=5 THEN PUT(0,0),Pic!,PSET
        IF MOUSE(1) < 0 OR MOUSE(1) > 488 OR MOU►►
SE(2) < 0 OR MOUSE(2) > 302 THEN CALL INITCURSOR►►
:GOTO PaintSkip
        IF Tool = 1 THEN CALL SETCURSOR(VARPTR(C►►
rsDry(0)))
        IF Tool = 2 THEN CALL SETCURSOR(VARPTR(C►►
rsPat(0)))
        IF Tool = 3 THEN CALL SETCURSOR(VARPTR(C►►
rsXOR(0)))
        PaintSkip:
    WEND
    CALL MOVETO(MOUSE(1),MOUSE(2))
    ON Tool GOSUB DryBrush,Pat.Paint,XORPaint
    CALL LINETO(MOUSE(1),MOUSE(2))
    PaintLoop:
        ON Tool GOSUB DryBrush,Pat.Paint,XORPaint
        CALL LINETO(MOUSE(1),MOUSE(2))
        IF MOUSE(0)>-1 THEN GET(0,0)-(487,301),P►►
ic!:GOTO Paint
    GOTO PaintLoop

Pat.Paint1:
    CALL SETCURSOR(VARPTR(CrsPat(0)))
    Tool=2:PENSIZE Px,Py
    MENU 2,1,1:MENU 2,2,2:MENU 2,3,1
    invert = 0
    RETURN

Pat.Paint:
    CALL PENPAT(VARPTR(Pat(RPat(INT(RND(1)*R))*4)))
    RETURN

DryBrush1:
    CALL SETCURSOR(VARPTR(CrsDry(0)))
    MENU 2,1,2:MENU 2,2,1:MENU 2,3,1
    invert = 0
    RETURN

DryBrush:
    x=INT(RND(1)*(Set(3)+1-Set(1)))+Set(1)
    y=INT(RND(1)*(Set(4)+1-Set(2)))+Set(2)
    CALL PENSIZE(x,y)
    invert = 0
    RETURN

XORPaint1:
    CALL SETCURSOR(VARPTR(CrsXOR(0)))
    MENU 2,1,1:MENU 2,2,1:MENU 2,3,2
    itemID = 5:GOSUB PatPick
    CALL PENMODE(10)
    invert = 1
    RETURN

XORPaint:
    CALL LINETO(MOUSE(1),MOUSE(2))
    RETURN

' Add other brush routines
' of your own here.

TitleScreen:
    WINDOW 2,"",(121,130)-(379,232),2
    MOVETO 8,20
    TEXTFONT 0
    PRINT"Painter"
    TEXTFONT 1:TEXTSIZE 9
    MOVETO 8,40:PRINT "by Mike Linkovich"
    MOVETO 8,52:PRINT "Copyright 1987 by MicroSP►►
ARC, Inc."
    MOVETO 70,92:PRINT"Click Here To Continue";
    WHILE MOUSE(0) = 0:WEND
    WINDOW CLOSE 2
    WHILE DIALOG(0) <> 0:WEND
RETURN


MenuFix:
    MenuID=MENU(0)
    itemID=MENU(1)
    MENU OFF
    GET(0,0)-(487,301),Pic!
    ON MenuID GOSUB File,Options,PenEdit,Sets
    IF invert THEN MENU 3,1,0 ELSE GOSUB FixWhite
    MENU : MENU ON
    RETURN
```

continued on next page

Listing 1 for Painter

PAINTER *(continued)*

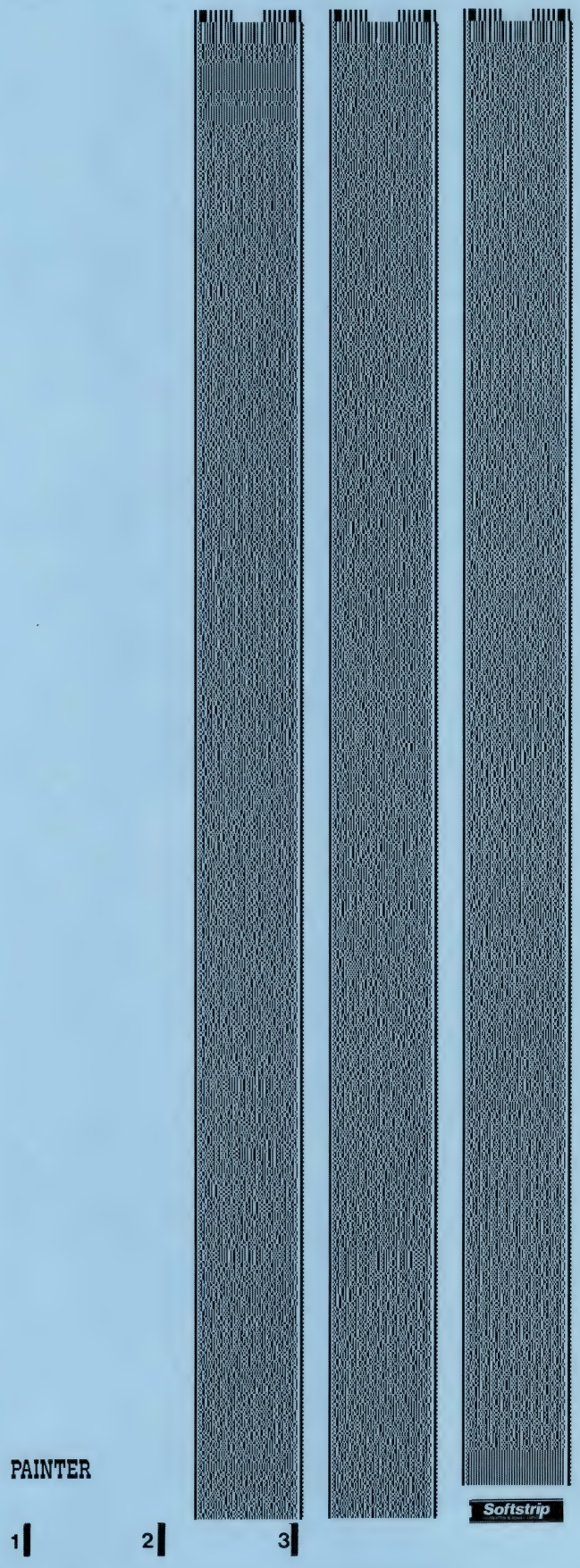
```
FixWhite:
    IF White THEN MENU 3,1,2 ELSE MENU 3,1,1
RETURN

File:
    ON itemID GOSUB ClrScr,Opn,Sve,Prt,SvClip,Qu►►
itBAS,Quit
    RETURN

Options:
    PENMODE 8:PENSIZE Px,Py:Tool=itemID
    CALL PENPAT(VARPTR(Pat(Patn*4)))
    ON itemID GOSUB DryBrush1,Pat.Paint1,XORPaint1
    RETURN

Sets:
    ON itemID GOSUB Dryvar,Pats,Sizes
    RETURN

PenEdit:
    IF itemID<6 THEN GOSUB PatPick
    IF itemID>6 AND itemID<10 THEN GOSUB SizePick
    RETURN

PatPick:
    FOR c=1 TO 5:MENU 3,c,1:NEXT:MENU 3,itemID,2►►
:Patn=itemID-1
    CALL PENPAT(VARPTR(Pat(Patn*4)))
    IF itemID = 1 THEN White = 1 ELSE White = 0
    RETURN

SizePick:
    FOR c=7 TO 9:MENU 3,c,1:NEXT:MENU 3,itemID,2
    Px=Set((itemID-6)*2+3):Py=Set((itemID-6)*2+4)
    PENSIZE Px,Py
    theSize = itemID
    RETURN

ClrScr:
    GOSUB Verify
    IF Act=3 OR (Act=1 AND F$="") THEN ClSkip
    CALL BACKPAT(VARPTR(Pat(Patn*4))):CLS
    GET(0,0)-(487,301),Pic!
    ClSkip:
    RETURN

Opn:
    GOSUB Verify
    IF Act=3 OR (Act=1 AND F$="") THEN OpSkip
    F$=FILES$(1,"PNTR")
    IF F$="" THEN OpSkip
    OPEN F$ FOR INPUT AS #1
        INPUT #1,c
        G$=INPUT$(c,1)
    CLOSE #1
    PICTURE ,G$
    GET(0,0)-(487,301),Pic!
    OpSkip:
    RETURN

Sve:
    F$=FILES$(0,"Save Painting as...")
    IF F$="" THEN SvSkip
    PICTURE ON
        PUT (0,0),Pic!,PSET
    PICTURE OFF
    G$=PICTURE$
    OPEN F$ FOR OUTPUT AS #1
        PRINT #1,LEN(G$)
        PRINT #1,G$
    CLOSE #1
    NAME F$ AS F$,"PNTR"
    PUT (0,0),Pic!,PSET
    SvSkip:
    RETURN

Prt:
    PICTURE ON
        PUT (0,0),Pic!,PSET
    PICTURE OFF
    G$=PICTURE$
    OPEN"LPT1:" FOR OUTPUT AS #1
        WINDOW OUTPUT #1
        PICTURE (70,175),G$
    CLOSE #1
    WINDOW OUTPUT 1
    RETURN

SvClip:
    PICTURE ON
        PUT (0,0),Pic!,PSET
    PICTURE OFF
    OPEN"CLIP:PICTURE" FOR OUTPUT AS 1
        PRINT #1,PICTURE$
    CLOSE #1
    RETURN

QuitBAS:
    GOSUB Verify
    IF Act=3 OR (Act=1 AND F$="") THEN QtBSkip
    WINDOW CLOSE 1
    MENU OFF
    MENU RESET
    END
    QtBSkip:
    RETURN

Quit:
    GOSUB Verify
    IF Act=3 OR (Act=1 AND F$="") THEN QtSkip
    WINDOW CLOSE 1
    MENU OFF
    MENU RESET
    SYSTEM
    QtSkip:
    RETURN

Dryvar:
    WINDOW 2,"",(105,105)-(400,225),-2
    TEXTFONT 0
    MOVETO 20, 25:TEXTFACE 4
    PRINT"Drybrush Variables"
    TEXTFACE 0:MOVETO 165,25:PRINT"Width   Height"
    MOVETO 50,52:PRINT"Minimum"
    MOVETO 50,72:PRINT"Maximum
    FOR c=1 TO 2
        EDIT FIELD c*2-1,STR$(Set(c*2-1)),(172,c►►
*20+20)-(200,c*20+35),1,3
        EDIT FIELD c*2,STR$(Set(c*2)),(221,c*20+►►
20)-(249,c*20+35),1,3
    NEXT
    BUTTON 6,1,"Ok",(210,90)-(280,112)
    E=1 : EDIT FIELD E
    DvLoop:
        Z = 0 : WHILE Z<>1 AND Z<>6 AND Z<>7 : Z►►
=DIALOG(0) : WEND
        IF Z=1 OR Z=6 THEN DvSkip
        E=E+1 : IF E>4 THEN E=1
        EDIT FIELD E : GOTO DvLoop
    DvSkip:
        Act$ = ""
        FOR c=1 TO 4
           IF LEN (EDIT$(c) )> 3 THEN Act$="A br►►
ush size is too big.": ELSE Set(c)=VAL(EDIT$(c))
        NEXT
        IF Act$ <> "" THEN GOSUB ErrMsg:GOTO DvLoop
        IF Set(1) > Set(3) OR Set(2) > Set(4) TH►►
EN Act$="A max is less than a min."
        IF Set(1) < 0 OR Set(2) < 0 OR Set(3) < ►►
0 OR Set(4) < 0 THEN Act$="Sizes must be positive."
        IF Set(1) > 500 OR Set(2) > 500 OR Set(3►►
) > 500 OR Set(4) > 500 THEN Act$="A brush size ►►
is too big."
        IF Act$="" THEN DvSkip2
        GOSUB ErrMsg : GOTO DvLoop
    DvSkip2:
        WINDOW CLOSE 2
    RETURN

Pats:
    WINDOW 2,"",(105,105)-(400,225),-2
    TEXTFONT 0:TEXTFACE 4
    MOVETO 17,22:PRINT"Pattern Paint shades"
    BUTTON 6,1,"Ok",(210,90)-(280,112)
```

```
    R(0)=45:R(1)=80:R(2)=61:R(3)=130
    BUTTON 1,B(1),"",(60,45)-(130,60),2
    CALL FRAMERECT(VARPTR(R(0)))
    BUTTON 2,B(2),"",(60,65)-(130,80),2
    R(0)=65:R(2)=81
    CALL FILLRECT(VARPTR(R(0)),VARPTR(Pat(4)))
    FRAMERECT(VARPTR(R(0)))
    BUTTON 3,B(3),"",(170,25)-(240,40),2
    R(0)=25:R(1)=190:R(2)=41:R(3)=240
    CALL FILLRECT(VARPTR(R(0)),VARPTR(Pat(8)))
    FRAMERECT(VARPTR(R(0)))
    BUTTON 4,B(4),"",(170,45)-(240,60),2
    R(0)=45:R(2)=61
    CALL FILLRECT(VARPTR(R(0)),VARPTR(Pat(12)))
    FRAMERECT(VARPTR(R(0)))
    BUTTON 5,B(5),"",(170,65)-(240,80),2
    R(0)=65:R(2)=81
    CALL FILLRECT(VARPTR(R(0)),VARPTR(Pat(16)))
    FRAMERECT(VARPTR(R(0)))
    PtsLoop:
        Z = 0 : WHILE Z<>1 AND Z<>6 : Z=DIALOG(0►►
) : WEND
        IF Z = 6 THEN PtsSkip
        Z = DIALOG(1)
        IF Z = 6 THEN PtsSkip
        IF B(Z) = 2 THEN B(Z) = 1 ELSE B(Z) = 2
        BUTTON Z,B(Z):GOTO PtsLoop
    PtsSkip:
        IF B(1)+B(2)+B(3)+B(4)+B(5) > 5 THEN Pts►►
Skip2
        Act$="At least one pattern must be selec►►
ted."
        GOSUB ErrMsg
        GOTO PtsLoop
    PtsSkip2:
        R=0:FOR c=1 TO 5
            IF B(c)=2 THEN RPat(R)=c-1:R=R+1
        NEXT
        WINDOW CLOSE 2
    RETURN

Sizes:
    WINDOW 2,"",(105,105)-(400,225),-2
    TEXTFONT 0
    MOVETO 18, 19:TEXTFACE 4
    PRINT"Pen Sizes" : TEXTFACE 0
    BUTTON 6,1,"Ok",(210,90)-(280,112)
    MOVETO 90,37:PRINT"Small":MOVETO 90,57:PRINT►►
"Medium"
    MOVETO 90,77:PRINT"Large";
    MOVETO 148,19:PRINT"Width   Height"
    FOR c=3 TO 5
        EDIT FIELD c*2-1,STR$(Set(c*2-1)),(160,c►►
*20-35)-(188,c*20-20),1,3
        EDIT FIELD c*2,STR$(Set(c*2)),(202,c*20-►►
35)-(230,c*20-20),1,3
    NEXT
    EDIT FIELD 5 : E=5
    SzLoop:
        Z = 0 : WHILE Z<>1 AND Z<>6 AND Z<>7 : Z►►
=DIALOG(0) : WEND
        IF Z=1 OR Z=6 THEN SzSkip
        E=E+1 : IF E>10 THEN E=5
        EDIT FIELD E : GOTO SzLoop
    SzSkip:
        Act$=""
        FOR c=5 TO 10
            IF LEN (EDIT$(c) )> 3 THEN Act$="A b►►
rush size is too big.": ELSE Set(c)=VAL(EDIT$(c))
        NEXT
        IF Act$ <> "" THEN GOSUB ErrMsg:GOTO SzLoop
        IF Set(5) < 0 OR Set(6) < 0 OR Set(7) < ►►
0 OR Set(8) < 0 OR Set(9) < 0 OR Set(10) < 0 THE►►
N Act$="Sizes must be positive."
        IF Set(5) > 500 OR Set(6) > 500 OR Set(7►►
) > 500 OR Set(8) > 500 OR Set(9) > 500 OR Set(1►►
0) > 500 THEN Act$="A brush size is too big."
        IF Act$="" THEN SzSkip2
        GOSUB ErrMsg : GOTO SzLoop
    SzSkip2:
        WINDOW CLOSE 2
        itemID = theSize
        GOSUB SizePick
    RETURN

Verify:
    WINDOW 2,"",(130,75)-(370,150),-2
    TEXTFONT 0:MOVETO 17,30
    PRINT "Save picture first?";
    BUTTON 1,1,"Yes",(17,40)-(77,60)
    BUTTON 2,1,"No",(84,40)-(144,60)
    BUTTON 3,1,"Cancel",(151,40)-(211,60)
    WHILE DIALOG(0)<>1:WEND
    Act=DIALOG(1)
    IF Act=1 THEN GOSUB Sve
    WINDOW CLOSE 2
    RETURN

ErrMsg:
    WINDOW 3,"",(90,40)-(410,106),-2
    BEEP : TEXTFONT 0 : MOVETO 17,20 : PRINT Act$;
    BUTTON 3,1,"Ok",(210,33)-(290,54)
    WHILE DIALOG(0)<>1:WEND
    WINDOW CLOSE 3
    RETURN

'Default brush values
DATA 1,1,10,10,5,5,10,10,15,15

'Cursor data for the Invert cursor
DATA 960,800,1824,1856,2880,2944,4992,4864,13056►►
,12800,30208,29696
DATA 30720,28672,24576,16384,960,992,2016,1984,4►►
032,3968,8064,7936
DATA 16128,15872,32256,31744,30720,0,0,0,15,1

'Cursor data for the Pattern cursor
DATA 960,992,1504,1728,3392,2688,5504,4864,10496►►
,8704,22016,17408
DATA 18432,28672,24576,16384,960,992,2016,1984,4►►
032,3968,8064,7936
DATA 16128,15872,32256,31744,30720,0,0,0,15,1

'Cursor data for the Drybrush cursor
DATA 960,992,2016,1856,2624,2688,4736,5888,12032►►
,8704,32256,21504
DATA 18432,28672,24576,16384,960,992,2016,1984,4►►
032,3968,8064,7936
DATA 16128,15872,32256,31744,30720,0,0,0,15,1
```

END OF LISTING 1

Important Note — When keying in the program, do *not* press Return at the end of lines that contain the ►► symbol.

Cauzin Strips for Painter



MULTI-VOICE SOUND CONTROL
Article on page 38

THIS PROGRAM IS AVAILABLE ON DISK

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. Painter, Multi-Voice Sound Control, CursorHatcher and MenuMaker are available on diskette for an introductory price of $19.95 plus $1.50 shipping/handling ($2.50 outside the U.S.) from Nibble Mac, 45 Winthrop St., Concord, MA 01742. Introductory price expires 6/30/87. See the Software Catalog in this issue for ordering information.

Listing 1 for Multi-Voice Sound Control
SOUND PHYSICS

```
'Sound Physics
'by Scott Barta
'Copyright (c) 1987
'by MicroSPARC, Inc.
'Concord, MA  01742
'Microsoft BASIC 2.0 (b) or higher
'Macintosh Plus owners should use
'BASIC 2.1 (b) or higher

    ON BREAK GOSUB BreakRoutine
    BREAK ON
    DEFINT A-Z
    DIM Rect(3),Text$(2)
    MENU 1,0,1,"File"
        MENU 1,1,1,"Quit to desktop"
        MENU 1,2,1,"Quit to BASIC"
    MENU 2,0,1,"Demonstrations"
        MENU 2,1,1,"Constructive interference"
        MENU 2,2,1,"Destructive interference"
        MENU 2,3,1,"Phase demonstration"
        MENU 2,4,1,"Beat demonstration"
        MENU 2,5,1,"Swept frequency demonstration"
        MENU 2,6,1,"Complex beat demonstration"
        MENU 2,7,1,"Break routine"
    MENU 3,0,0,"":MENU 4,0,0,"":MENU 5,0,0,""
    WINDOW 1,,(100,100)-(411,241),-4
    CALL MOVE(36,12):CALL TEXTSIZE(24)
    PRINT "Sound Effects Demo";
    CALL TEXTSIZE (12):PRINT
    CALL MOVE(108,0):PRINT "By Scott Barta"
    CALL MOVE(45,0):PRINT "Copyright 1987 by Mic►►
roSPARC, Inc."
    PRINT:CALL MOVE(54,0)
    PRINT"Press OK and select a menu item."
    BUTTON 1,1,"OK",(105,110)-(205,130)
    Rect(0)=107:Rect(1)=102:Rect(2)=133:Rect(3)=208
    CALL PENSIZE(2,2)
    CALL FRAMEROUNDRECT(VARPTR(Rect(0)),16,16)
    WHILE Event<>1 AND Event<>6:Event=DIALOG(0):►►
WEND
MainLoop:
    WINDOW CLOSE 1
    MENU 1,0,1:MENU 2,0,1:MenuID=0
    WHILE MenuID=0:MenuID=MENU(0):WEND
    IF MenuID=1 THEN ON MENU(1) GOTO Finder,BASI►►
C ELSE ON MENU(1) GOSUB Constructive,Destructive►►
,Phase,Beat,Swept,Complex,BreakRoutine
    GOTO MainLoop
Constructive:
    WAVE 0,SIN:WAVE 1,SIN
    Title$="Constructive Interference"
    Text$(0)="Demonstrates how two identical tones"
    Text$(1)="played together will create a tone ►►
louder"
    Text$(2)="than each of the individual tones."
    TitleLength!=2.25: GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually..."
    GOSUB Delay:SOUND 1000,18.5,,1: GOSUB Delay
    CLS:PRINT "Both tones played together..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,18.5,,0:SOUND 1000,18.5,,1
    SOUND RESUME:GOSUB Delay:RETURN
Destructive:
    WAVE 0,SIN:WAVE 1,SIN,128
    Title$="Destructive interference"
    Text$(0)="Demonstrates how two nearly identi►►
cal"
    Text$(1)="tones played together will cancel"
    Text$(2)="each other out to produce silence."
    TitleLength!=2.125:GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually,":PRIN►►
T "180 degrees out of phase..."
    GOSUB Delay:SOUND 1000,18.5,,1:GOSUB Delay
    CLS:PRINT "Both tones played together..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,18.5,,0:SOUND 1000,18.5,,1
    SOUND RESUME:GOSUB Delay:RETURN
Phase:
    WAVE 0,SIN:WAVE 1,SIN
    Title$="Phase Demonstration"
    Text$(0)="Demonstrates the effect of combini►►
ng a"
    Text$(1)="frequency with swept phase with a ►►
constant"
    Text$(2)="tone of fixed phase."
    TitleLength!=1.75:GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually..."
    PRINT "Sweeping through the phases..."
    GOSUB Delay
    PRINT:CALL MOVE(50,0):PRINT "Phase:";
    FOR Phase=0 TO 255
        CALL MOVETO(90,60):PRINT Phase;
        WAVE 1,SIN,Phase
        SOUND 1000,1,,1
        FOR Counter=1 TO 75:NEXT
    NEXT
    CLS:PRINT "Both tones played together..."
    PRINT "Tone 2 will have swept phase..."
    GOSUB Delay
    PRINT:CALL MOVE(50,0):PRINT "Phase:";
    FOR Phase=0 TO 255
        CALL MOVETO(90,60):PRINT Phase;
        WAVE 1,SIN,Phase
        SOUND WAIT
        SOUND 1000,1,,0:SOUND 1000,1,,1
        SOUND RESUME
        FOR Counter=1 TO 75:NEXT
    NEXT
    RETURN
Beat:
    WAVE 0,SIN:WAVE 1,SIN
    Title$="Beat Demonstration"
    Text$(0)="Demonstrates how similar frequencies"
    Text$(1)="played together interfere with eac►►
h other"
    Text$(2)="to create 'beats'"
    TitleLength!=1.625:GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually..."
    PRINT "As in demonstration 1..."
    GOSUB Delay:SOUND 1001,18.5,,1:GOSUB Delay
    PRINT "As in demonstration 2..."
    GOSUB Delay:SOUND 1000.5,18.5,,1:GOSUB Delay
    PRINT "As in demonstration 3..."
    GOSUB Delay:SOUND 1002,18.5,,1:GOSUB Delay
    CLS:PRINT "Both tones played together..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,74,,0:SOUND 1001,74,,1
    SOUND RESUME:GOSUB Delay:GOSUB Delay:GOSUB D►►
elay
    PRINT "Halving the beat frequency..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,74,,0:SOUND 1000.5,74,,1
    SOUND RESUME:GOSUB Delay:GOSUB Delay:GOSUB D►►
elay
    PRINT "Doubling the beat frequency..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,74,,0:SOUND 1002,74,,1
    SOUND RESUME:GOSUB Delay:GOSUB Delay:GOSUB D►►
elay
    RETURN
Swept:
    WAVE 0,SIN:WAVE 1,SIN
    Title$="Swept frequency demonstration"
    Text$(0)="Demonstrates how high beat rates"
```

continued on next page

Listing 1 for Multi-Voice Sound Control

SOUND PHYSICS *(continued)*

```
    Text$(1)="blend together to form a separate"
    Text$(2)="tone in addition to the major one."
    TitleLength!=2.75:GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually..."
    PRINT "Sweeping through the frequencies..."
    GOSUB Delay:CALL MOVETO(50,50):PRINT "Freque►►
ncy:"
    FOR Frequency=1000 TO 1030
        CALL MOVETO(120,50):PRINT Frequency
        SOUND Frequency,2.3,1
        FOR Counter=1 TO 400:NEXT
    NEXT
    CLS:PRINT "Both tones played together..."
    PRINT "Sweeping through the frequencies..."
    GOSUB Delay:CALL MOVETO(50,50):PRINT "Freque►►
ncy:"
    FOR Frequency=1000 TO 1030
        CALL MOVETO(120,50):PRINT Frequency
        SOUND WAIT
        SOUND 1000,18.5,,0:SOUND Frequency,18.5,,1
        SOUND RESUME
        FOR Counter=1 TO 2000:NEXT
    NEXT
    RETURN
Complex:
    WAVE 0,SIN:WAVE 1,SIN:WAVE 2,SIN:WAVE 3,SIN
    Title$="Complex beat Demonstration"
    Text$(0)="Demonstrates the effect of playing"
    Text$(1)="many similar frequencies at once."
    Text$(2)=""
    TitleLength!=2.5:GOSUB StandardWindow
    GOSUB Tone1
    CLS:PRINT "Tone 2 played individually..."
    GOSUB Delay:SOUND 1000.5,18.5,,1:GOSUB Delay
    CLS:PRINT "Tone 3 played individually..."
    GOSUB Delay:SOUND 1001,18.5,,2:GOSUB Delay
    CLS:PRINT "Tone 4 played individually..."
    GOSUB Delay:SOUND 999,18.5,,3:GOSUB Delay
    CLS:PRINT "All tones played together..."
    GOSUB Delay:SOUND WAIT
    SOUND 1000,74,,0:SOUND 1000.5,74,,1
    SOUND 1001,74,,2:SOUND 999,74,,3
    SOUND RESUME:GOSUB Delay:GOSUB Delay:GOSUB D►►
elay
    RETURN
Finder:
    SYSTEM
BASIC:
    END
Tone1:
    PRINT "Tone 1 played individually..."
    GOSUB Delay:SOUND 1000,18.5,,0:GOSUB Delay
    RETURN
StandardWindow:
    WINDOW 1,,(100,100)-(411,241),-4
    CALL MOVE((((4.25-TitleLength!)/2)*72),0)
    PRINT Title$:PRINT
    FOR Counter=0 TO 2
        PRINT Text$(Counter)
    NEXT
    PRINT:PRINT"Press 'Start' to begin."
    BUTTON 1,1,"Start",(105,116)-(205,136)
    Rect(0)=113:Rect(1)=102:Rect(2)=139:Rect(3)=208
    CALL PENSIZE(2,2)
    CALL FRAMEROUNDRECT (VARPTR(Rect(0)),16,16)
    Event=0
    WHILE Event<>1 AND Event<>6:Event=DIALOG(0):►►
WEND
    BUTTON CLOSE 1:CLS:RETURN
Delay:
    FOR Counter=1 TO 4000:NEXT:RETURN
BreakRoutine:
    WINDOW 1,,(375,21)-(505,40),4
    CALL TEXTFONT(0):CALL MOVETO(6,15)
    PRINT "Program Stopped";
    WAVE 0,SIN:WAVE 1,SIN
    SOUND 600,36.4,,0:SOUND 600.25,36.4,,1
    Trash=MOUSE(0):X=MOUSE(1):Y=MOUSE(2)
    WHILE MOUSE(1)=X AND MOUSE(2)=Y
        Trash=MOUSE(0)
    WEND:WINDOW CLOSE 1:END
```

END OF LISTING 1

MENUMAKER

Article on page 40

THIS PROGRAM IS AVAILABLE ON DISK

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. Painter, Multi-Voice Sound Control, CursorHatcher and MenuMaker are available on diskette for an introductory price of $19.95 plus $1.50 shipping/handling ($2.50 outside the U.S.) from Nibble Mac, 45 Winthrop St., Concord, MA 01742. Introductory price expires 6/30/87. See the Software Catalog in this issue for ordering information.

Listing 1 for MenuMaker

MENUMAKER

```
' MenuMaker
' by Ian McLellan
' Copyright (C) 1987
' by MicroSPARC, Inc.
' Concord, MA  01742
' MS Basic 2.0 (b)
' Macintosh Plus owners should
' use 2.1 or higher.

'    INITIALIZING SECTION
VarSetup:
    DEFINT A-z
    DIM Item$(9,20), Key$(9,20), Style$(9,20), S►►
tatus(9,20)
    DIM NoItems(9)
    False=0:  True=NOT False
    TitleFlag=False

    'ToolBox Menu routine values:
    AppendMenu=&HA933
    GetMHandle=&HA949
    DIM Code(5)
    LongReturn!=0:Handle!=0:WordReturn=0
    Long=2:Word=1:Nil=0

TitleWindow:
    Altered=False
    WINDOW CLOSE WINDOW(0)
    WINDOW 2,"",(15,250)-(495,330),4
    CLS
    TEXTFONT 2:TEXTSIZE 18:LOCATE 1,15:  PRINT "►►
MenuMaker"
    TEXTFONT 1:TEXTSIZE 12:LOCATE 3,10:  PRINT "►►
By Ian McLellan     Copyright (C)1987 by MicroSP►►
ARC, Inc."     '5 spaces
    PRINT:LOCATE 5,7
    TEXTFACE 1:PRINT "Press ";:TEXTFONT 0:PRINT ►►
CHR$(17);
    TEXTFONT 3:PRINT "1-9 (Except 2) to change t►►
he menu titles.";
    TEXTFACE 0

MenuSetUp:
'    Set up the user menus, but skip the edit menu
    FOR m=1 TO 9
        IF m=2 THEN m=3
        NoItems(m)=0
        Item$(m,0)="#"+MID$(STR$(m),2)
        Status(m,0)=1
        Style$(m,0)="":Key$(m,0)=""
        MenuNumber=m:GOSUB BuildMenu
    NEXT m

    '    do MenuMaker menu
    MENU 10,0,1,"MenuMaker"
        MENU 10,1,1,"New..."
        MENU 10,2,0,"-"
        MENU 10,3,1,"Save..."
        MENU 10,4,0,"-"
        MENU 10,5,1,"Quit to Basic"
        MENU 10,6,1,"Quit to Finder"
    MENU ON:  ON MENU GOSUB MenuEvent

'    WAITING SECTION
```

```
Idle:
    IF PEEK(378)<128 THEN Idle     'command key p►►
ressed?
    k$=INKEY$:IF k$="" THEN Idle
    k=ASC(k$)-16
    IF k<1 OR k=2 OR k>9 THEN Idle     'is it 1 o►►
r 3-9?
    Item$=Item$(k,0)
    Status=Status(k,0)
    CALL GetTitle(Item$,Status,Cancelled)
    IF Cancelled THEN Idle
    Item$(k,0)=Item$
    Status(k,0)=Status
    MenuNumber=k:GOSUB BuildMenu
    Altered=True
GOTO Idle

MenuEvent:
    Cancelled=0
    MENU
    MenuId=MENU(0)
    ItemId=MENU(1)
    IF MenuId=10 THEN MenuMakerMenus
    IF ItemId<=NoItems(MenuId) THEN AlterItem

'    USER MENU SECTION

AddItem:
    Item$="" : Key$="":Style$="P":Status=1
    CALL GetItem(Item$,Key$,Style$,Status,Cancel►►
led)
    IF Cancelled THEN ExitAdd
    Item$(MenuId,ItemId)=Item$
    Key$(MenuId,ItemId)=Key$
    Style$(MenuId,ItemId)=Style$
    Status(MenuId,ItemId)=Status
    NoItems(MenuId)=NoItems(MenuId)+1
    MenuNumber=MenuId : GOSUB BuildMenu
    Altered=True
ExitAdd:
RETURN

AlterItem:
    WINDOW 1,"",(100,100)-(338,204),-2
    MOVETO 20,12
    TEXTFONT 0
    PRINT "What do you want to do"
    MOVETO 20,27
    PRINT "with this item?"
    BUTTON 1,1,"Edit",(25,42)-(99,60)
    BUTTON 2,1,"Delete",(25,70)-(99,88)
    BUTTON 3,1,"Insert",(141,42)-(215,60)
    Outline 4,1,"Cancel",141,70,215,88
    d=0
    WHILE d<>1 AND d<>6
        d=DIALOG(0)
    WEND
    WINDOW CLOSE 1
    b=DIALOG(1)
    IF b=4 OR d=6 THEN RETURN
    ON b GOSUB EditItem,DeleteItem,InsertItem
RETURN

EditItem:
    Item$=Item$(MenuId,ItemId)
    Key$=Key$(MenuId,ItemId)
    Style$=Style$(MenuId,ItemId)
    Status=Status(MenuId,ItemId)
    CALL GetItem(Item$,Key$,Style$,Status,Cancel►►
led)
    IF Cancelled THEN ExitEdit
    Item$(MenuId,ItemId)=Item$
    Key$(MenuId,ItemId)=Key$
    Style$(MenuId,ItemId)=Style$
    Status(MenuId,ItemId)=Status
    MenuNumber=MenuId : GOSUB BuildMenu
    Altered=True
ExitEdit:
RETURN

DeleteItem:
    IF NoItems(MenuId)=0 THEN ExitDelete
    WINDOW 1,"",(100,100)-(338,204),-2
    MOVETO 20,12
    TEXTFONT 0
    PRINT "Delete the item '";Item$(MenuId,ItemI►►
d);"'"
    MOVETO 20,27
    PRINT "from the '";Item$(MenuId,0);"' menu?"
    BUTTON 1,1,"OK",(25,70)-(99,88)
    Outline 2,1,"Cancel",141,70,215,88
    d=0
    WHILE d<>1 AND d<>6:d=DIALOG(0):WEND
    b=DIALOG(1)
    WINDOW CLOSE 1
    IF b=2 OR d=6 THEN ExitDelete
    FOR x=ItemId TO NoItems(MenuId)-1
        Item$(MenuId,x)=Item$(MenuId,x+1)
        Key$(MenuId,x)=Key$(MenuId,x+1)
        Style$(MenuId,x)=Style$(MenuId,x+1)
        Status(MenuId,x)=Status(MenuId,x+1)
    NEXT x
    NoItems(MenuId)=NoItems(MenuId)-1
    MenuNumber=MenuId : GOSUB BuildMenu
    Altered=True
ExitDelete:
RETURN

InsertItem:
    IF NoItems(MenuId)=20 THEN ExitInsert
    WINDOW 1,"",(100,100)-(338,204),-2
    MOVETO 20,12
    TEXTFONT 0
    PRINT "Insert before '";Item$(MenuId,ItemId)►►
;"'"
    MOVETO 20,27
    PRINT "from the '";Item$(MenuId,0);"' menu?"
    BUTTON 1,1,"OK",(25,70)-(99,88)
    Outline 2,1,"Cancel",141,70,215,88
    d=0
    WHILE d<>1 AND d<>6:d=DIALOG(0):WEND
    b=DIALOG(1)
    WINDOW CLOSE 1
    IF b=2 OR d=6 THEN ExitInsert
    Item$="":Key$="":Style$="P":Status=1
    CALL GetItem(Item$,Key$,Style$,Status,Cancel►►
led)
    IF Cancelled THEN ExitInsert
    FOR x=NoItems(MenuId) TO ItemId STEP -1
        Item$(MenuId,x+1)=Item$(MenuId,x)
        Key$(MenuId,x+1)=Key$(MenuId,x)
        Style$(MenuId,x+1)=Style$(MenuId,x)
        Status(MenuId,x+1)=Status(MenuId,x)
    NEXT x
    Item$(MenuId,ItemId)=Item$
    Key$(MenuId,ItemId)=Key$
    Style$(MenuId,ItemId)=Style$
    Status(MenuId,ItemId)=Status
    NoItems(MenuId)=NoItems(MenuId)+1
    MenuNumber=MenuId : GOSUB BuildMenu
    Altered=True
ExitInsert:
RETURN

'    MENUMAKER SECTION

MenuMakerMenus:
    ON ItemId GOSUB NewSet,Idle,SaveSet,Idle,Qui►►
t,Quit
RETURN

NewSet:
    IF NOT Altered THEN DoNew
    WINDOW 1,"",(100,100)-(338,204),-2
    MOVETO 19,12
    PRINT "Save changes before clearing?"
    Outline 1,1,"Yes",25,42,99,60
    BUTTON 2,1,"No",(27,70)-(99,88)
    BUTTON 3,1,"Cancel",(141,70)-(215,88)
    d=0
    WHILE d<>1 AND d<>6 : d=DIALOG(0) : WEND
    b=DIALOG(1)
    WINDOW CLOSE 1
    IF b=3 THEN RETURN
    IF b=1 OR d=6 THEN GOSUB SaveSet
DoNew:
    CLS
```

continued on next page

Listing 1 for MenuMaker

MENUMAKER *(continued)*

```
    PRINT "Restarting...  Click the OK button to ►►
continue."
    Outline 1,1,"OK",300,25,375,50
    d=0
    WHILE d<>1 AND d<>6 : d=DIALOG(0) : WEND
GOTO TitleWindow

SaveSet:
    WINDOW 1,"",(100,75)-(408,190),-2
    MOVETO 10,20
    PRINT "Where would you like to save the menus?
    Outline 1,1,"OK",50,75,130,95
    BUTTON 2,1,"Cancel",(170,75)-(250,95)
    BUTTON 3,1,"On the clipboard",(90,27)-(215,4►►
2),3
    BUTTON 4,2,"In a text file",(90,47)-(215,62),3
    Location=2
SaveLoop:
    d=0
    WHILE d<>1 AND d<>6 : d=DIALOG(0): WEND
    b=DIALOG(1)
    IF b=2 THEN ExitSave
    IF b=1 OR d=6 THEN SaveOK
    BUTTON Location+2,1
    Location=b-2
    BUTTON Location+2,2
    GOTO SaveLoop
SaveOK:
'    Get a file name
    WINDOW CLOSE 1
    IF Location =1 THEN FileName$="CLIP:TEXT" EL►►
SE FileName$=FILES$(0,"Save menus as...")
    TEXTFONT 2:TEXTSIZE 18:LOCATE 1,15:  PRINT "►►
MenuMaker"
    IF FileName$="" THEN ExitSave
StartSave:
    WINDOW 1,"",(150,150)-(250,170),-2
    CALL SetWatchCursor
    PRINT "Please wait...";
    FOR m=1 TO 9 : IF m=2 THEN m=3
        IF NoItems(m)>0 THEN LastMenu=m
    NEXT m
    OPEN FileName$ FOR OUTPUT AS #1     'open use►►
r file
    RESTORE ProgData
    READ in$
    WHILE in$ <>"***END"     'add part one of pro►►
gram code
        PRINT #1,in$
        READ in$
    WEND
    PRINT #1,"    ON MenuId GOSUB ";     'create ►►
ON-GOSUB for menus
    FOR m=1 TO LastMenu
        IF m=2 THEN PRINT #1,"Idle";:GOTO SkipName
        CALL AlphaOnly(Item$(m,0),Add$)
        IF Add$="Idle" THEN Add$="Menu"+STR$(m)
        PRINT #1,Add$;
SkipName:
        IF m<>LastMenu THEN PRINT #1,",";
    NEXT m
    PRINT #1,""
    PRINT #1, "MENU"
    PRINT #1,"RETURN"
    PRINT #1,""
    FOR m=1 TO LastMenu
        IF m=2 THEN SkipMenu
        CALL AlphaOnly(Item$(m,0),Label$)     'cr►►
eate labels for menus
        IF Label$="Idle" THEN Label$="Menu"+STR$(m)
        PRINT #1,Label$;":"
        PRINT #1,"    ON ItemID GOSUB ";     'cre►►
ate ON-GOSUB for items
        FOR i=1 TO NoItems(m)
            CALL AlphaOnly(Item$(m,i),Item$)
            IF Item$<>"Idle" THEN PRINT #1,Label►►
$;Item$; ELSE PRINT #1,Item$;
            IF i<>NoItems(m) THEN PRINT #1,",";
        NEXT i
        PRINT #1,""
        PRINT #1,"RETURN"
        PRINT #1,""
        FOR i=1 TO NoItems(m)
            CALL AlphaOnly(Item$(m,i),Item$)     ►►
'create labels for items
            IF Item$="Idle" THEN SkipLabel
            PRINT #1,Label$;Item$;":"
            PRINT #1,"'    This is where your ro►►
utine for '";Item$(m,i);"' goes."
            PRINT #1,"RETURN"
            PRINT #1,""
SkipLabel:
        NEXT i
SkipMenu:
    NEXT m
    PRINT #1,""
    READ in$
    WHILE in$<>"***END"     'add part two of prog►►
ram code
        PRINT #1,in$
        READ in$
    WEND
    PRINT #1,""
    PRINT #1,"MenuData:"     'create menu DATA st►►
atements
    IF LastMenu<5 THEN RealLast=LastMenu:LastMenu=5
    PRINT #1,"    DATA ";LastMenu
    FOR m=1 TO LastMenu
        IF m=2 THEN m=3
        IF m>RealLast THEN Item$(m,0)="":Status(►►
m,0)=0
        PRINT #1,"    DATA ";Item$(m,0);",";Stat►►
us(m,0)
        PRINT #1,"    DATA ";NoItems(m)
        IF NoItems(m)=0 THEN SkipMData
        PRINT #1,"    DATA ";
        FOR i=1 TO NoItems(m)
            Add$=Item$(m,i)
            IF Key$(m,i)<>"" THEN Add$=Add$+"/"+►►
Key$(m,i)
            IF Style$(m,i)<>"P" THEN Add$=Add$+"►►
<"+Style$(m,i)
            IF Status(m,i)=0 THEN Add$="("+Add$
            IF Status(m,i)=2 THEN Add$=Add$+"!!"
            PRINT #1,Add$;
            IF i MOD 5=0 OR i=NoItems(m) THEN PR►►
INT #1,"" ELSE PRINT #1,",";
            IF i MOD 5=0 THEN PRINT #1,"    DATA ";
        NEXT i
SkipMData:
    NEXT m
    PRINT #1,""
    READ in$
    WHILE in$<>"***END"     'add part three of pr►►
ogram code
        PRINT #1,in$
        READ in$
    WEND
    CLOSE #1
    INITCURSOR
    Altered=False
ExitSave:
    WINDOW CLOSE 1
RETURN

Quit:
    IF NOT Altered THEN Leave
    WINDOW 1,"",(100,100)-(338,204),-2
    MOVETO 19,12
    PRINT "Save changes before quitting?"
    Outline 1,1,"Yes",25,42,99,60
    BUTTON 2,1,"No",(27,70)-(99,88)
    BUTTON 3,1,"Cancel",(141,70)-(215,88)
    d=0
    WHILE d<>1 AND d<>6 : d=DIALOG(0) : WEND
    b=DIALOG(1)
    WINDOW CLOSE 1
    IF b=3 THEN RETURN
    IF b=1 OR d=6 THEN GOSUB SaveSet
Leave:
    WINDOW CLOSE 1
    MENU RESET
    IF ItemId=5 THEN END ELSE SYSTEM
```

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Listing 1 for MenuMaker

MENUMAKER *(continued)*

```
'     PROGRAM SUBROUTINES/SUBPROGRAMS

AdjustLong:
    Temp!=VARPTR(LongReturn!)
    LongReturn!=2^24*PEEK(Temp!) + 2^16*PEEK(Tem►►
p!+1) + 2^8*PEEK(Temp!+2) + PEEK(Temp!+3)
RETURN

BuildMenu:
'     Build up menu #MenuNumber
    Add$=Item$(MenuNumber,0)
    IF Status(MenuNumber,0)=0 THEN Add$=CHR$(&H1►►
3)+Add$     'diamond means inactive
    MENU MenuNumber,0,1,Add$
    CALL Setup(GetMHandle,Long)
    CALL ToolBox!(LongReturn!,MenuNumber+1)
    GOSUB AdjustLong:Handle!=LongReturn!
    IF NoItems(MenuNumber)=0 THEN AppendAddItem
    FOR x=1 TO NoItems(MenuNumber)
  Key$=Key$(MenuNumber,x)
    Style$=Style$(MenuNumber,x)
    Status=Status(MenuNumber,x)
        Add$=Item$(MenuNumber,x)
        IF Key$<>"" THEN Add$=Add$+"/"+Key$
        IF Style$<>"P" THEN Add$=Add$+"<"+Style$
        IF Status=0 THEN Add$=Add$+"!"+CHR$(&H13►►
)    'diamond means inactive
        IF Status=2 THEN Add$=Add$+"!"+CHR$(&H12►►
)    'checkmark means selected
        CALL Setup(AppendMenu,Nil)
        CALL ToolBox!(Handle!,Add$)
    NEXT x
    IF NoItems(MenuNumber)=20 THEN ExitBuild
AppendAddItem:
    CALL Setup(AppendMenu,Nil)
    CALL ToolBox!(Handle!,"Add an item...")
ExitBuild:
RETURN

SUB Outline (Number,Status,Text$,Top,Left,Bottom►►
,Right) STATIC
    BUTTON Number,Status,Text$,(Top,Left)-(Botto►►
m,Right)
    r(0)=Left-4 : r(1)=Top-4
    r(2)=Right+4 : r(3)=Bottom+4
    PENSIZE 3,3
    FRAMEROUNDRECT VARPTR(r(0)),16,16
END SUB

SUB GetItem(Item$,Key$,Style$,Status,Cancelled) ►►
STATIC
    SetWatchCursor
    oe$="":dash=0
    FOR m=1 TO 10:IF m=2 THEN m=3
        MENU m,0,0
    NEXT m
    WINDOW 1,"",(75,50)-(430,255),2
    BUTTON 2,1,"Cancel",(260,180)-(350,200)
    BUTTON 3,1,"Make Bar",(260,120)-(350,140)
    BUTTON 4,1,"Plain",(60,55)-(180,70),3
    BUTTON 5,1,"Bold",(60,70)-(180,85),3
    BUTTON 6,1,"Underline",(60, 85)-(180,100),3
    BUTTON 7,1,"Italic",(60,100)-(180,115),3
    BUTTON 8,1,"Outline",(60,115)-(180,130),3
    BUTTON 9,1,"Shadow",(60,130)-(180,145),3
    BUTTON INSTR("---PBUIOS",Style$),2
    BUTTON 10,1,"Inactive",(60,150)-(180,165),3
    BUTTON 11,1,"Active",(60,165)-(180,180),3
    BUTTON 12,1,"Selected",(60,180)-(180,195),3
    BUTTON Status+10,2
    TEXTFONT 0
    EDIT FIELD 1,Item$,(87,2)-(287,17)
    EDIT FIELD 2,Key$,(106,23)-(131,37)
    ef=-1:EDIT FIELD 1
    IF LEFT$(Item$,1)="-" THEN GOSUB Disable
RefreshItem:
    MOVETO 5,15
    PRINT"Item Name:"
    MOVETO 5,35
    PRINT"Command Key:"
    MOVETO 20,67
    PRINT"Style:"
    MOVETO 12,162
    PRINT"Status:"
    Outline 1,1,"OK",260,150,350,170
    INITCURSOR
ItemLoop:
    d=0:b=0
    WHILE d=0
        d=DIALOG(0)
        IF LEFT$(oe$,1)="-" AND LEFT$(EDIT$(1),1►►
)<>"-" THEN GOSUB Enable:oe$=EDIT$(1)
        IF LEFT$(oe$,1)<>"-" AND LEFT$(EDIT$(1),►►
1)="-" THEN GOSUB Disable:oe$=EDIT$(1)
        IF dash<>1 THEN IF LEN(EDIT$(2))>1 THEN ►►
BEEP:ef=0:EDIT FIELD 2,LEFT$(EDIT$(2),1),(106,23►►
)-(131,37)
    WEND
    IF d=7 AND dash<>1 THEN ef=NOT ef:EDIT FIELD ►►
ef+2
    IF d=6 THEN Set
    IF d=5 THEN RefreshItem
    IF d=2 THEN ef=DIALOG(2)-2:EDIT FIELD ef+2
    IF d=1 THEN b=DIALOG(1)
    IF b=1 THEN Set
    IF b=2 THEN Cancelled=1:GOTO ExitItem
    IF b=3 THEN EDIT FIELD 1,"-",(87,2)-(287,17)►►
:GOSUB Disable
    IF b>3 AND b<10 THEN BUTTON INSTR("---PBUIOS►►
",Style$),1:BUTTON b,2:Style$=MID$("---PBUIOS",b,1)
    IF b>9 AND b<13 THEN BUTTON Status+10,1:BUTT►►
ON b,2:Status=b-10
GOTO ItemLoop
Disable:
'     Disable buttons for a dash
    FOR b=4 TO 12
        BUTTON b,0
    NEXT b
    Status=0:BUTTON 10,2
    Style$="P":BUTTON 4,2
    EDIT FIELD CLOSE 2
    LINE (106,23)-(131,37),,b
    LINE (106,23)-(131,37)
    LINE (106,37)-(131,23)
    dash=1:ef=-1:EDIT FIELD ef+2
RETURN

Enable:
'     Re-enable buttons for non-dash
    FOR b=4 TO 12
        BUTTON b,1
    NEXT b
    BUTTON 10,2
    BUTTON 4,2
    EDIT FIELD 2,Key$,(106,23)-(131,37)
    dash=0:EDIT FIELD ef+2
RETURN
Set:
    IF EDIT$(1)="" THEN ItemLoop
    Item$=EDIT$(1)
    IF LEN(Item$)>25 THEN Item$=LEFT$(Item$,25)
    IF LEFT$(Item$,1)<>"-" THEN Key$=UCASE$(EDIT►►
$(2)) ELSE Key$=""     'Key$ is a capital
    Cancelled=0
ExitItem:
    WINDOW CLOSE 1
    FOR m=1 TO 10 : IF m=2 THEN m=3
        MENU m,0,1
    NEXT m
    TEXTFONT 2:TEXTSIZE 18:LOCATE 1,15:  PRINT "►►
MenuMaker"
    TEXTFONT 3:TEXTSIZE 12
END SUB

SUB GetTitle(Item$,Status,Cancelled) STATIC
    FOR m=1 TO 10:IF m=2 THEN m=3
        MENU m,0,0
    NEXT m
    WINDOW 1,"",(75,100)-(430,200),2
    BUTTON 2,1,"Cancel",(260,45)-(350,65)
    BUTTON 3,1,"Inactive",(60,60)-(180,75),3
```

continued on next page

Listing 1 for MenuMaker

MENUMAKER *(continued)*

```
    BUTTON 4,1,"Active",(60,75)-(180,90),3
    BUTTON Status+3,2
    TEXTFONT 0
    EDIT FIELD 1,Item$,(87,2)-(287,17)
RefreshTitle:
    MOVETO 5,15
    PRINT"Item Name:"
    MOVETO 12,57
    PRINT"Status:"
    Outline 1,1,"OK",260,75,350,95
TitleLoop:
    d=0:b=0
    WHILE d=0:d=DIALOG(0):WEND
    IF d=6 THEN SetTitle
    IF d=5 THEN RefreshTitle
    IF d=1 THEN b=DIALOG(1)
    IF b=1 THEN SetTitle
    IF b=2 THEN Cancelled=1:GOTO ExitTitle
    IF b=3 OR b=4 THEN BUTTON Status+3,1:BUTTON ►►
b,2:Status=b-3
GOTO TitleLoop
SetTitle:
    IF EDIT$(1)="" THEN TitleLoop
    Item$=EDIT$(1)
    IF LEN(Item$)>5 THEN Item$=LEFT$(Item$,5)
ExitTitle:
    WINDOW CLOSE 1
    FOR m=1 TO 10 : IF m=2 THEN m=3
        MENU m,0,1
    NEXT m
    TEXTFONT 2:TEXTSIZE 18:LOCATE 1,15: PRINT "M►►
enuMaker"
    TEXTFONT 3:TEXTSIZE 12
END SUB

SUB SetWatchCursor STATIC
    DIM Watch(33)
    RESTORE WatchData
    FOR j=0 TO 33
        READ Watch(j)
    NEXT j
    SETCURSOR VARPTR(Watch(0))
    ERASE Watch
WatchData:
    DATA 2016,2016,2016,2016,2064,4232,4232,4236
    DATA 5004,4104,4104,2064,2016,2016,2016,2016
    DATA 2016,2016,2016,2016,4080,8184,8184,8184
    DATA 8184,8184,8184,4080,2016,2016,2016,2016
    DATA 8,8
END SUB

SUB AlphaOnly(in$,out$) STATIC
    out$=""
    FOR j=1 TO LEN(in$)
        c$=UCASE$(MID$(in$,j,1))
        IF c$<"A" OR c$>"Z" THEN SkipLetter
        out$=out$+MID$(in$,j,1)
SkipLetter:
    NEXT j
    IF out$="" THEN out$="Idle"
END SUB

' The following code was originally published
' as part of the article "Nibbling at
' MS Basic Menus" by Bruce R. Land.
' Nibble Mac, July/Aug 1986, Page 36
' It has been slightly modified to work
' with more memory configurations.

SUB Setup(TrapName,ReturnType) STATIC
    SHARED Code(),LongReturn!,WordReturn,ToolBox!
    SaveRtn=&022137
    JmpBack=&047322
    MoveWord=&031737
    MoveLong=&021737
    Nop=&H4E71
    Code(0)=SaveRtn
    Code(1)=TrapName
    Code(2)=Nop : Code(3)=Nop : Code(4)=Nop
    Code(5)=JmpBack
    ON ReturnType GOSUB WordType,LongType
    ToolBox!=VARPTR(Code(0))
    EXIT SUB
WordType:
    Code(2)=MoveWord
    Code(3) = VARPTR(WordReturn)/2^16 + (65536! ►►
* ((VARPTR(WordReturn)/2^16)>32767))
    Code(4) = VARPTR(WordReturn)-Code(3)*2^16 + ►►
(65536! * ((VARPTR(WordReturn)-Code(3)*2^16)>327►►
67))
RETURN
LongType:
    Code(2)=MoveLong
    Code(3) = VARPTR(LongReturn!)/2^16 + (65536! ►►
* ((VARPTR(LongReturn!)/2^16)>32767))
    Code(4) = (VARPTR(LongReturn!)-Code(3)*2^16) ►►
+ (65536! * ((VARPTR(LongReturn!)-Code(3)*2^16)>►►
32767))
    IF Code(3) > 1 THEN  Code(3) = Code(3) -1
RETURN
END SUB

ProgData: ' program data
DATA "InitVariables:"
DATA "    DEFINT a-z"
DATA " '    Your variable definitions go here."
DATA  ""
DATA " '    Menu Variables:"
DATA "   DIM Code(5):ToolBox!=0:Nil=0:Word=1:Lon►►
g=2"
DATA "   LongReturn!=0:Handle!=0:WordReturn=0"
DATA "   AppendMenu=&HA933"
DATA "  GetMHandle=&HA949"
DATA ""
DATA "GOSUB MenuSetup"
DATA "ON MENU GOSUB MenuEvent"
DATA "MENU ON"
DATA ""
DATA "Idle:"
DATA "GOTO Idle"
DATA ""
DATA "MenuEvent:"
DATA "    MenuId=MENU(0)"
DATA "    ItemId=MENU(1)"
DATA "***END"
DATA "MenuSetup:"
DATA "    RESTORE MenuData"
DATA  "    excl$ = chr$(33)+chr$(33)
DATA "    READ NoMenus"
DATA "    FOR m=1 TO NoMenus"
DATA "        IF m=2 THEN m=3"
DATA "        READ Title$,Status"
DATA "        MENU m,0,Status,Title$"
DATA "        CALL Setup(GetMHandle,Long)"
DATA "        CALL ToolBox!(LongReturn!,m+1)"
DATA "        GOSUB AdjustLong"
DATA "        Handle!=LongReturn!"
DATA "        READ NoItems"
DATA "        FOR i=1 TO NoItems"
DATA "            READ Item$"
DATA "            IF RIGHT$(Item$,2)=excl$ THEN ►►
Item$=LEFT$(Item$,LEN(Item$)-1)+CHR$(&H12)"
DATA "            CALL Setup(AppendMenu,Nil)"
DATA "            CALL ToolBox!(Handle!,Item$)"
DATA "        NEXT i"
DATA "    NEXT m"
DATA "RETURN"
DATA "***END"
DATA "SUB Setup(TrapName,ReturnType) STATIC"
DATA "    SHARED Code(),LongReturn!,WordReturn,T►►
oolBox!"
DATA "    SaveRtn=&022137"
DATA "    JmpBack=&047322"
DATA "    MoveWord=&031737"
DATA "    MoveLong=&021737"
DATA "    Nop=&H4E71"
DATA "    Code(0)=SaveRtn"
DATA "    Code(1)=TrapName"
DATA "    Code(2)=Nop : Code(3)=Nop : Code(4)=Nop"
DATA "    Code(5)=JmpBack"
DATA "    ON ReturnType GOSUB WordType,LongType"
DATA "    ToolBox!=VARPTR(Code(0))"
DATA "    EXIT SUB"
```

```
DATA "WordType:"
DATA "    Code(2)=MoveWord"
DATA "    Code(3) = VARPTR(WordReturn)/2^16 + (6►►
5536! * DATA ((VARPTR(WordReturn)/2^16)>32767))"
DATA "    Code(4) = VARPTR(WordReturn)-Code(3)*2►►
^16 + (65536! * ((VARPTR(WordReturn)-Code(3)*2^1►►
6)>32767))"
DATA "     IF Code(3) > 1 THEN  Code(3) = Code(3►►
) -1"
DATA "RETURN"
DATA "LongType:"
DATA "    Code(2)=MoveLong"
DATA "    Code(3) = VARPTR(LongReturn!)/2^16 + (►►
65536!*((VARPTR(LongReturn!)/2^16)>32767))"
DATA "    Code(4) = (VARPTR(LongReturn!)-Code(3)►►
*2^16)+(65536!*((VARPTR(LongReturn!)-Code(3)*2^1►►
6)>32767)) "
DATA "     IF Code(3) > 1 THEN  Code(3) = Code(3►►
) -1"
DATA "RETURN"
DATA "END SUB"
DATA " AdjustLong:"
DATA "    Temp!=VARPTR(LongReturn!)"
DATA "    LongReturn!=2^24*PEEK(Temp!) + 2^16*PE►►
EK(Temp!+1) + 2^8*PEEK(Temp!+2) + PEEK(Temp!+3)"
DATA "RETURN"
DATA "***END"
```

END OF LISTING 1

Important Note — When keying in the program, do *not* press Return at the end of lines that contain the ►► symbol.

Have you created a powerful program, a super spreadsheet template, a first-class font, or a secret power user technique for using programs like MacWrite or MacPaint? Share your creation with Nibble Mac's readers! You'll be paid generously for your article, and if your work is included on a Nibble Mac disk, you'll earn royalties, too!

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CURSOR HATCHING

Article on page 44

THIS PROGRAM IS AVAILABLE ON DISK

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. Painter, Multi-Voice Sound Control, CursorHatcher and MenuMaker are available on diskette for an introductory price of $19.95 plus $1.50 shipping/handling ($2.50 outside the U.S.) from Nibble Mac, 45 Winthrop St., Concord, MA 01742. Introductory price expires 6/30/87. See the Software Catalog in this issue for ordering information.

Listing 1 for Cursor Hatching

CURSORHATCHER.c

```
/* CursorHatcher, Part 1
 * by Jan Eugenides
 * Copyright 1987 by MicroSPARC, Inc.
 * Concord, MA  01742
 *
 * LightspeedC compiler
 */

#include <MacTypes.h>
#include <pascal.h>
#include <MenuMgr.h>
#include <WindowMgr.h>
#include <DialogMgr.h>
#include <EventMgr.h>
#include <ControlMgr.h>
#include <ToolboxUtil.h>
#include <QuickDraw.h>

typedef Cursor   *CursorPtr;

/*define some constants*/
/*to make things more readable*/
#define lastMenu 3
#define appleMenu 1
#define fileMenu 256
#define editMenu 257
#define NULL 0L

/*array of menu handles*/
MenuHandle    menuHandles[lastMenu+1];
EventRecord   ev;
EventRecord   *ep;
int           done;
Rect          dragRect,wRect,patRect;
Rect          bRect;
ControlHandle bH;
Rect          growRect = {100,100,338,512};
/*window pointers*/
WindowPtr     wPtr,whichWindow;
WindowRecord  wRec;
Cursor        newCursor;
Rect          gridRect1[256],gridRect2[256];
int           gridBits1[256],gridBits2[256];
Rect          tempRect;
int           hotSpot=0;

DoButton()
{
/*if Hot Spot button pressed set hotSpot*/
if(TrackControl(bH,ep->where,NULL))
  SetHot();
}

SetHot()
{
register int i;
DimMenus(TRUE);     /*dim the menus*/
HiliteControl(bH,255); /*dim the button*/
do{   /*wait for mouseDown event*/
  SystemTask();
  } while (!GetNextEvent(mDownMask,ep));
```

continued on next page

Listing 1 for Cursor Hatching

CURSORHATCHER.c *(continued)*

```
GlobalToLocal(&ep->where);
for(i = 0; i < 256; i++)
  /*find grid rectangle clicked*/
  if(PtInRect(ep->where,&gridRect1[i]))
     {  /*reset former hot spot*/
        /*to black or white*/
     if(gridBits1[hotSpot])
        PenPat(black);
     else
        PenPat(white);
     PaintRect(&gridRect1[hotSpot]);
     PenPat(gray);
     /*draw hot spot in gray*/
     PaintRect(&gridRect1[i]);
     hotSpot = i;
     PenPat(black);
     break;
     }
DrawLines();  /*redraw the borders*/
DimMenus(FALSE); /*enable menus*/
HiliteControl(bH,0); /*enable button*/
}

TransGrids()
{
register int i;

for(i = 0; i < 256; i++)
  {
  /*Move cursor data to mask grid*/
  gridBits2[i] = gridBits1[i];
  if(gridBits2[i]) /*redraw grid accordingly*/
     PenPat(black);
  else
     PenPat(white);
  PaintRect(&gridRect2[i]);
  }
PenNormal();
DrawLines(); /*redraw borders*/
}


ClearCursor()
{
register int i;

for(i = 0; i < 256; i++)
  {
  /*set all data to zeroes*/
  gridBits2[i] = gridBits1[i] = 0;
  PenPat(white);
  /*clear both grids*/
  PaintRect(&gridRect2[i]);
  PaintRect(&gridRect1[i]);
  }
PenNormal();
DrawLines();/*redraw borders*/
}

HandleMouse()
{
register int i;
Point   mousePoint;
int     mode;

/*translate to local coordinates of window*/
GlobalToLocal(&ep->where);
/*check if button was clicked*/
if(PtInRect(ep->where,&bRect))
  {
  DoButton(); /*handle a button click*/
  return;
  }

for(i = 0; i < 256; i++)
  /*check if mouse was clicked in*/
  /*cursor grid*/
  if(PtInRect(ep->where,&gridRect1[i]))
     {
     InvertRect(&gridRect1[i]);
     /*if grid point was on, turn off and*/
     /*set mode to erase, else turn on and*/
     /*set mode to draw*/
     if(gridBits1[i])
       {gridBits1[i] = 0;mode=0;}
     else
        {gridBits1[i] = 1;mode=1;}
     break;
     }
for(i = 0; i < 256; i++)
  /*check if mouse was clicked in*/
  /*mask grid*/
  if(PtInRect(ep->where,&gridRect2[i]))
     {
     InvertRect(&gridRect2[i]);
    /*set mode as before*/
     if(gridBits2[i])
        {gridBits2[i] = 0;mode=0;}
     else
        {gridBits2[i] = 1;mode=1;}
     break;
     }

/*while the mouse button is held down*/
while(StillDown())
  {
  /*get the mouse position*/
  GetMouse(&mousePoint);
  for(i = 0; i < 256; i++)
     if(PtInRect(mousePoint,&gridRect1[i]))
        {
        /*draw or erase grid rectangles*/
        /*as mouse is dragged*/
        if(mode)
           PenPat(black);
        else
           PenPat(white);
        PaintRect(&gridRect1[i]);
        if(mode)
           gridBits1[i] = 1;
        else
           gridBits1[i] = 0;
        }
  for(i = 0; i < 256; i++)
     if(PtInRect(mousePoint,&gridRect2[i]))
        {
        if(mode)
           PenPat(black);
        else
           PenPat(white);
        PaintRect(&gridRect2[i]);
        if(mode)
           gridBits2[i] = 1;
        else
           gridBits2[i] = 0;
        }
  /*be sure pen is set to defaults*/
  PenNormal();
  /*redraw borders*/
  DrawLines();
  }
}

/*dim or enable all menus*/
/*according to n*/
DimMenus(n)
int  n;
{
register int i;

for(i = 1; i<=lastMenu; i++)
  if(n)
     DisableItem(menuHandles[i],0);
  else
     EnableItem(menuHandles[i],0);
DrawMenuBar();
}

MaintMenus()
{
if(FrontWindow() == wPtr)
```

```
  {
  /*dim edit menu items*/
  /*that we don't use*/
  DisableItem(menuHandles[3],1);
  DisableItem(menuHandles[3],3);
  DisableItem(menuHandles[3],4);
  DisableItem(menuHandles[3],5);
  }
else
  {
  /*enable them for desk*/
  /*accessories to use*/
  EnableItem(menuHandles[3],1);
  EnableItem(menuHandles[3],3);
  EnableItem(menuHandles[3],4);
  EnableItem(menuHandles[3],5);
  }
}

/*routine to build menus*/
SetUpMenus()
{
int   i;
char appletitle[2];

InitMenus();
appletitle[0] = 1;   appletitle[1] = appleMark;
menuHandles[1] = NewMenu(appleMenu, appletitle);
AddResMenu(menuHandles[1], 'DRVR');
menuHandles[2] = NewMenu(fileMenu,"\pFile");
AppendMenu(menuHandles[2],"\pSave Cursor.../S;Da►►
ta->Mask/D;Quit/Q");
menuHandles[3] = NewMenu(editMenu,"\pEdit");
AppendMenu(menuHandles[3],"\pUndo /Z;(-;Cut /X;C►►
opy /C;Paste /V;Clear/B;");
for (i=1; i<=lastMenu; i++)
  InsertMenu(menuHandles[i], 0);
DrawMenuBar();
}

/*routine to handle menu commands*/
DoCommand(themenu, theitem)
int themenu, theitem;
{
GrafPtr temport;
char       name[64];
int        daNum;

switch (themenu)
  {
  /*item selected from Apple menu*/
  case appleMenu:
     switch(theitem)
     {
     default: /*get the DA name*/
        GetItem(menuHandles[1], theitem, name);
        GetPort(&temport); /*save current port*/
        daNum = OpenDeskAcc(name);/*open the DA*/
        SetPort(temport); /*restore the port*/
        break;
     }
     break;

  case fileMenu:
     switch(theitem)
        {
        case 1:
           SaveCursor();
           break;
        case 2:
           TransGrids();
           break;
         case 3: /*Quit item selected*/
              done = 1; /*set done flag*/
              break;
        }
        break;

  case editMenu:
     if (SystemEdit(theitem-1)) break;
     switch(theitem)
        {
        case 6:
           ClearCursor();
           break;
        }
  }
 /*unhighlight menu when done*/
  HiliteMenu(0);
}

/*create one line of rectangles in each grid*/
/*each time it's called*/
LineORects(x)
int x;
{
register int i;
Rect    botRect,mTop,mBot;

botRect.left = tempRect.left;
botRect.right = tempRect.right;
botRect.top = mBot.top = tempRect.top+64;
botRect.bottom = mBot.bottom = tempRect.bottom+64;
mTop.left = mBot.left = tempRect.left+168;
mTop.right = mBot.right = tempRect.right+168;
mTop.top = tempRect.top;
mTop.bottom = tempRect.bottom;

for(i = x; i<x+16;i++)
  {
  gridRect1[i]=tempRect;
  gridRect1[i+128]=botRect;
  gridRect2[i] = mTop;
  gridRect2[i+128]=mBot;
  OffsetRect(&tempRect,8,0);
  OffsetRect(&botRect,8,0);
  OffsetRect(&mTop,8,0);
  OffsetRect(&mBot,8,0);
  }
}

ReStart()
{
ExitToShell();/*resume procedure*/
}
/***********************************/
main()
{
int     temp,code;

InitGraf(&thePort); /*standard inits*/
InitFonts();
FlushEvents(everyEvent, 0);
InitWindows();
SetUpMenus();
TEInit();
InitDialogs(ReStart);
InitCursor();
MaxApplZone();
done = 0;
ep = &ev;
SetRect(&patRect,354,32,488,192);
/*set dragging area to size of screen*/
dragRect = screenBits.bounds;
/*set up window rect*/
SetRect(&wRect,4,40,504,338);
wPtr = NewWindow(&wRec,&wRect,"\pCursorHatcher",►►
TRUE,0,-1L,FALSE,0L);
SetPort(wPtr);
/*set up grid rectangles*/
SetRect(&tempRect,16,32,24,40);
LineORects(0);
SetRect(&tempRect,16,40,24,48);
LineORects(16);
SetRect(&tempRect,16,48,24,56);
LineORects(32);
SetRect(&tempRect,16,56,24,64);
LineORects(48);
SetRect(&tempRect,16,64,24,72);
LineORects(64);
SetRect(&tempRect,16,72,24,80);
LineORects(80);
SetRect(&tempRect,16,80,24,88);
LineORects(96);
SetRect(&tempRect,16,88,24,96);
LineORects(112);
```

continued on next page

Listing 1 for Cursor Hatching

CURSORHATCHER.c *(continued)*

```
/*create one pushbutton*/
SetRect(&bRect,38,200,128,216);
bH = NewControl(wPtr,&bRect,"\pSet Hot Spot",
                    TRUE,0,0,1,pushButProc,0L);

/*Main loop*/
do {
SystemTask(); /*support DAs*/
SetCurs();    /*maintain cursor*/
MaintMenus(); /*maintain menus*/
/*get an event*/
temp = GetNextEvent(everyEvent, ep);
if(!temp) continue; /*no events */
switch (ep->what)   /*handle event*/
  {
   case mouseDown: /*mouse was clicked*/
                   /*find out where*/
     code = FindWindow(ep->where, &whichWindow);
     switch (code)
     {
     case inMenuBar: /*menu item selected*/
        DoCommand(MenuSelect(ep->where)); break;

     case inSysWindow: /*clicked on desktop*/
        SystemClick(ep, whichWindow);
        break;

    case inDrag: /*clicked in title bar*/
                 /*if it's not the front window*/
                 /*make it the front window*/
                 /*otherwise drag it*/
           if(whichWindow != FrontWindow())
              {
              SelectWindow(whichWindow);
              break;
              }
           DragWindow(whichWindow,ep->where, &dr►►
agRect);
           break;

     case inContent:
           /*if not the front window*/
           /*make it the front window*/
           if(whichWindow != FrontWindow())
              {
              SelectWindow(whichWindow);
              break;
              }
           else
              /*handle mouseDown event*/
              HandleMouse();
           break;

     default:
           break;
     }/*end of mousedown switch*/
     break;

    case activateEvt:
        /*if click in our window*/
        /*activate the window*/
        if((WindowPtr)ep->message == wPtr)
           DoActivate(ep->message,ep);
        break;

  case updateEvt:
        BeginUpdate(ep->message);
        DoUpdate(ep->message);
        EndUpdate(ep->message);
        break;

  case keyDown:
  case autoKey: /*key has been pressed*/
                /*if Command key is down*/
                /*do the menu command*/
        if(ep->modifiers & 256)
           DoCommand(MenuKey((int)(ep->message & ►►
255)));
        break;

  default:
     break;

  }/*end of event switch*/
 /*loop until done flag is non-zero*/
 } while (!done);

CloseWindow(wPtr); /*close our window*/
ExitToShell();    /*return to Finder*/
}

DoActivate(wPtr,ep)
WindowPtr     wPtr;
EventRecord   *ep;
{
/*not much to do in this application*/
SetPort(wPtr);
}

DoUpdate(wPtr) /*handle update events*/
WindowPtr     wPtr;
{

SetPort(wPtr);/*by redrawing window contents*/
DrawRects();
DrawLines();
DrawPats();
TextFont(0);
MoveTo(68,175);
DrawString("\pData");
MoveTo(234,175);
DrawString("\pMask");
MoveTo(365,210);
DrawString("\pTest Cursor Here");
DrawControls(wPtr); /*redraw the button*/
}

DrawLines()
{
register int i;
Rect  square;

/*draw grid borders*/
SetRect(&square,15,31,145,161);
FrameRect(&square);
SetRect(&square,183,31,313,161);
FrameRect(&square);
/*draw hot spot*/
PenPat(gray);
PaintRect(&gridRect1[hotSpot]);
PenPat(black);
}

DrawPats()
{
Rect    dRect;

/*draw patterns for cursor testing*/
SetRect(&dRect,354,32,488,64);
PenPat(gray);
PaintRect(&dRect);
PenPat(dkGray);
OffsetRect(&dRect,0,32);
PaintRect(&dRect);
PenPat(ltGray);
OffsetRect(&dRect,0,32);
PaintRect(&dRect);
PenPat(black);
OffsetRect(&dRect,0,64);
PaintRect(&dRect);
FrameRect(&patRect);
}

DrawRects()
{
register int i;

/*redraw the grid rectangles*/
for(i = 0; i < 256; i++)
  {
  if(gridBits1[i])
     PenPat(black);
```

```
  else
     PenPat(white);
  PaintRect(&gridRect1[i]);
  if(gridBits2[i])
     PenPat(black);
  else
     PenPat(white);
  PaintRect(&gridRect2[i]);
  }
PenNormal();
}


SetCurs()
{
Point   mousePoint;

/*if our window is not in front, do nothing*/
if(FrontWindow() != wPtr) return;
GetMouse(&mousePoint);
/*change cursor according*/
/*to screen position*/
if(PtInRect(mousePoint,&patRect))
  {
  MakeCursor();
  SetCursor(&newCursor);
  }
else
  SetCursor(&arrow);
}

/*calculate bit map for cursor from*/
/*grid data*/
Combine1Bits(n)
int  n;
{
register int i;
int     cursByte,place;

cursByte = 0;
place = 1;
/*for each grid rectangle*/
/*check grid data and OR it into the cursor byte*/
/*return the completed cursor byte*/
for(i = (n*16)+15; i >= n*16 ; i--)
  {
  cursByte |= gridBits1[i]*place;
  place *=2;
  }
return(cursByte);
}

/*calculate bytes for mask*/
/*according to grid data*/
/*works the same as for the cursor*/
Combine2Bits(n)
int  n;
{
register int i;
int     cursByte,place;

cursByte = 0;
place = 1;
for(i = (n*16)+15; i >= n*16 ; i--)
  {
  cursByte |= gridBits2[i]*place;
  place *=2;
  }
return(cursByte);

}

 /*create a cursor from the grid data*/
MakeCursor()
{
CursorPtr  cptr;
register int i;

cptr = &newCursor;
cptr->hotSpot.v = hotSpot / 16;
cptr->hotSpot.h = hotSpot % 16;
for(i=0;i<16;i++)
  {
  cptr->data[i] = Combine1Bits(i); /*do cursor*/
  cptr->mask[i] = Combine2Bits(i); /*do the mask*/
  }
}

SaveCursor()
{
Rect       dRect;
DialogPtr  dPtr;

SysBeep(3); /*short beep*/
/*make dialog window*/
SetRect(&dRect,100,100,404,238);
dPtr = NewDialog(NULL,&dRect,"\p",TRUE,1,-1L,FAL►►
SE,NULL,NULL);
SetPort(dPtr); /*set the port to new window*/
MoveTo(18,16);
DrawString("\pTune in next time when we study");
MoveTo(18,32);
DrawString("\presources. We'll add this function");
MoveTo(18,48);
DrawString("\pthen!");
MoveTo(70,130);
DrawString("\pClick mouse to continue.");
while(!Button()); /*wait for mouse click*/
FlushEvents(mDownMask,NULL);/*dequeue the click*/
CloseDialog(dPtr);
SetPort(wPtr);
}
```

END OF LISTING 1

THE ERROR TRAP

Telecommunicators: Use your 1200 or 300 baud modem to receive the latest errata notices or order a Nibble Mac/MicroSPARC product. The Nibble Hot Line provides up-to-the-minute, 24 hour technical information on Nibble Mac programs plus other goodies. Have your Mac call the Hot Line at 617-369-8920. Set your communications software at 8 data bits, 1 stop bit, no parity, full duplex. The Hot Line will automatically determine the correct baud rate.

SCSI Hard Disks Compared (Nov./Dec. 1986, p. 35): PBI Software's backup utility was incorrectly referred to as PBI Backup. "HD Back-up" is the correct name of the software.

AN OVERVIEW OF BASIC 3.0

continued from page 29

note that this program will only run under MS BASIC 3.0 because it requires the new ROM libraries.

HOW IT WORKS

Example 1 begins by loading in the necessary library file. This library contains all of the subprograms that execute the ROM calls. It then initializes all of the variables that will be used by the subprograms since they must all be initialized beforehand. The variables are explained in **Table 1**.

The program uses the SetRect ROM call to load the arrays. The scr%( ) array is used to define the area in which the text will appear. The bar%( ) array defines the area in which the scroll bar will appear. The program then proceeds to frame the text area.

The NewScroll routine accepts as input: the rectangle to draw the bar in; whether the bar is to be visible or not; the minimum value of the bar; the maximum value of the bar; and the initial value of the bar. The routine then draws the scroll bar if it is visible and returns a handle to it, which is used in further operations with the scroll bar.

The program then reads in the text that will be displayed and displays the instructions to the user.

The ScrollText routine accepts as input: the rectangle in which the text will appear, the array in which the text is stored, the line of the array that will be located at the top of the text area, the number of rows to be scrolled, the number of the line to be highlighted, and the delay in 60ths of a second between screen updates. The routine compares the current value of the scroll bar with the value for the first line to be displayed. If the values differ, then the routine redraws the text. Since the top line variable starts out with an initial value of zero, the routine is forced to draw the text. From then on, only changes in the state of the scroll bar will cause the text to be redrawn.

The program then enters a loop, using GetMouse to check the mouse coordinates and status, using PointInRect to see if it is clicked outside the text area, updating linenum% to highlight the appropriate lines, and calling ScrollText to update/redraw the text.

When the program is finished, DisposeScroll is called. This routine *must* be called to dispose of the storage used by the scroll bar because BASIC will not do it when the program ends. If the storage is not disposed of and the program is run again, a new scroll bar is added on top of the old one — which may bring about a system crash, and you'll see the bomb.

GRADING THE UPGRADE

The program, although short, aptly demonstrates the capabilities of the new BASIC. It makes using scroll bars fairly simple. This simplicity of use appears to hold true for all the new routines.

Microsoft has added an impressive number of new features and commands to an already good version of BASIC. Using this new revision, programs can be written to do almost anything previously accessible only through another language. The tried and true CLR libraries provide good support for existing programs and programmers who use them. Even if you already have the CLR libraries, the new commands and HFS support make the upgrade definitely worth having. If you've never used the CLR libraries, then you should see what you're missing!

Jan Eugenides'

Desk Necessities

Unique Desk Accessories, Utilities and Function Keys

Desk Necessities is a software grab bag packed with potent programs that will make your Mac a lot easier and more convenient to use! The nine-program package spotlights:

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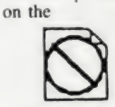

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LETTERS

continued from page 8

rate line. It is also enhanced by REM statements. Is this clarity at the expense of speed of operation? Does it make any differencce at all?

Alan B. Combs
Austin, TX

The answer to your question is no, it doesn't make any difference where you put your subroutines in MS BASIC, and REMs do not usually affect the speed. MS BASIC for the Macintosh is structured differently from Applesoft BASIC.

Each time a GOSUB is performed, Applesoft must search from the beginning of the program until it finds the requested subroutine. That's why an Applesoft program will run faster if the subroutines are near the beginning of the program. Shorter programs also run faster for the same reason, so removing REMs and combining lines will affect the speed because they affect the length.

When an MS BASIC program is run, all of the labels and their respective locations are tokenized and put in a table. MS BASIC does not have to search for subroutines because they are all in the table. Thus, there is no appreciable speed advantage to placing subroutines at the beginning of the program.

The length of the program also has very little effect on the speed because there is no searching going on. The only exception to this involves extremely long programs, or programs run on a 128K Macintosh. If memory is especially tight, MS BASIC is forced to continuously remove parts of itself from memory to make room, then reload them from the disk when they are needed again.

Disk access is a slow process, and has a pronounced effect on the speed of execution.

—Ed.

Editor's Note: Errata and enhancements to *Nibble Mac* programs can now be found at the end of the Program Listings Section in our new section called The Error Trap.

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ON THE MAC SCENE

Edited by Mary Locke

EXPERCOMMON LISP is an artificial intelligence development system that lets you create applications for end users who do not have Lisp on their machines. It has over 1,100 primitives and an incremental compiler that generates 68000 native code directly from Lisp source code. It features a powerful and transparent memory management/optimization technique that lets only those routines actually in use be held in RAM. A class system with a full set of tools for object-oriented programming is fully integrated with the compiler for fast execution and with the automatic symbolic debugger for fast development. The program gives you direct access to the Toolbox. EXPERCOMMON LISP is priced at $995. The optional file compiler is priced at $495. Contact: **ExperTelligence, Inc., 559 San Ysidro Rd., Santa Barbara, CA 93108, (805) 969-7871.**

TURBO PASCAL can compile and run up to eight separate programs simultaneously. Multiple editing windows let you have several windows open at a time, switch from one window to another, and edit, compile, and execute each window individually. The program can compile over 12,000 lines of code per minute. It has a unit structure in which the separate compilation of routines creates modules that can be linked to any TURBO PASCAL program. The program also includes a TurtleGraphics unit that operates in a full-screen window. TURBO PASCAL is compatible with Lisa Pascal and HFS and is priced at $99.95. Contact: **Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066, (408) 438-8400.**

MAPMAKER 1.1 lets you create professional quality maps of any state, counties in a state, group of states, the entire United States, or countries of the world, separately or in any combination. The maps may be used to graphically express data relationships. The four-disk package comes with 58 demographic and population statistics for each state, 13 for every U.S. county, and 20 population statistics for 176 countries. You can enter up to 30 variables at a time for each area or import data from spreadsheets or databases. Just click on the areas you want to include, the patterns and colors (if printing with the ImageWriter II) to be used, and the fonts and styles for text and labels. A map legend is automatically created. The maps can be printed anywhere on a page and can be as large as 8 1/2 by 11 inches. MAPMAKER requires 512K and is priced at $295. Contact: **Select Micro Systems, 2717 Crescent Dr., Yorktown Heights, NY 10598, (914) 245-4670.**

MACTOGS ASSEMBLER / LINKER lets you use a Macintosh to develop Apple IIGS assembly language programs. The fully implemented 65816 assembler and linker produces stand-alone IIGS applications. It can also produce absolute binary images for ROM and complete information for symbolic debugging. The program includes tools for transfer of source and application files between the Mac and IIGS. It assembles up to 10,000 instructions per minute and uses a fast, mouse-driven, multiple window editor with an undo option. Its intelligent Linker/Librarian eliminates unused code. The program is compatible with the Apple IIGS Programmers' Workshop and supports all IIGS Tool Kit ROM and Library routines. The program requires a Macintosh 512E or Mac Plus and is priced at $195. Contact: **Consulair Corp., 140 Campo Dr., Portola Valley, CA 94025, (415) 851-3272.**

MATHWRITER is an editor that provides precision and flexibility in displaying and printing mathematical expressions. Using the mouse with a user-customizable palette on the screen, you can compose even the most complex mathematical expressions with little use of the keyboard. The program automatically sizes and places superscripts, subscripts, parentheses, fraction bars, matrices, and integral and summation symbols. With MATHWRITER, you can easily handle the mixture of fonts, font sizes, symbols, and complex placement of characters needed. It produces MacDraw- and MacPaint-compatible files in addition to its own unique data files. The output can be transferred to other applications such as word processors. MATHWRITER is priced at $49.95. Contact: **Cooke Publications, P.O. Box 4448, Ithaca, NY 14852.**

LOC is a strategy game package for all ages that includes four games played on a hexagonal board. In LOC, each player chooses a set of pieces and players take turns making jumps. As pieces are jumped, they change to pieces of the player who jumped over them. The object of the game is to have the most pieces at the end when no player can make a move. You can play LOC against other people or play against the computer at various skill levels. Simple Match is a game for children. In Match, one or two players can match the hidden pieces. Catch Me is a speed game in which the goal is to quickly click on pieces as soon as they are animated and before the animation stops. LOC game players can choose pieces from more than 50 that come on the disk or use the Piece Editor to change them or create new ones. LOC is priced is $49.95. Contact: **Great Wave Software, 104 Gilbert Ave., Menlo Park, CA 94025, (415) 325-2202.**

WRITER'S WORKSHOP is a specialized database that lets you store all types of information, including graphics. In the Manuscript program, writers can keep track of their ideas, publisher payment rates and submitted works. Letters to publishers can be generated also. With the Bookkeeper program, financial records can be maintained and various reports can be generated, including a summary of monthly income and expenses. A library for source materials can be developed using the Reference program. On a single form there is room for bibliographic data and extensive notes. A simple index can be created to sort information. WRITER'S WORKSHOP runs on a 512K Mac or Mac Plus and requires an external or hard drive. It is priced at $99. Contact: **FutureSoft System Designs, Inc., P.O. Box 132, New York, NY 10012, (212) 674-5195.**

LIGHTSPEED PASCAL is a development system with a fast interactive compiler, linker and editor that allows you to see multiple views of your program while it runs. Watch your source code execute one line at a time, observe values of variables, try out new code and view Toolbox calls. You can build applications in small manageable segments while the built-in Project Manager keeps track of all your sources and libraries. When you make a change, the Project Manager remembers it. With a single keystroke, it recompiles and relinks only the files that have changed. Syntax errors are identified as you type in your program. LIGHTSPEED PASCAL is priced at $125. Contact: **Think Technologies, Inc., 420 Bedford St., Lexington, MA 02173, (617) 863-5590.**

HYPER-C is a C compiler that produces 68000 native code stand-alone programs. The system includes a multiwindow program text editor, an object-oriented HYPER-C preprocessor and compiler, and a 68000 assembler. The program features a fast RANLIB style librarian, an intelligent overlay linker, and runtime libraries with source code. A reference manual is included. HYPER-C is priced at $50. Contact: **WSM Group, Inc., P.O. Box 32005, Tucson, AZ 85751, (602) 298-7910.**

TOTEM is a removable 5¼ in. cartridge disk system for the Macintosh and Macintosh Plus. It offers anywhere from 20 MB to 140 MB of storage. The TOTEM family of storage subsystems features a full range of fixed, hard disk drives available in combination with a 20-MB removable Bernoulli drive or standalone. All TOTEM drives support the SCSI interface. Contact: **Bering Industries, Inc., 280 Technology Circle, Scotts Valley, CA 95066, (408) 438-8779.**

THE MOTOROLA 68020/68881 PROCESSOR BOARD is upgrade hardware for the Macintosh 512K and Macintosh Plus,

continued on next page

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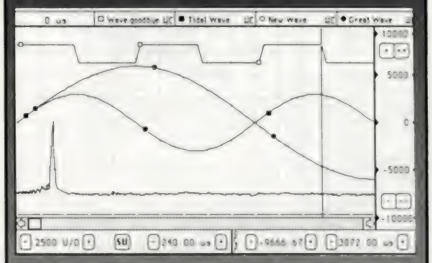

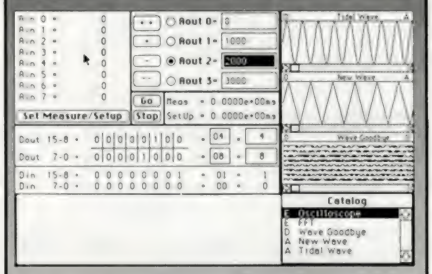

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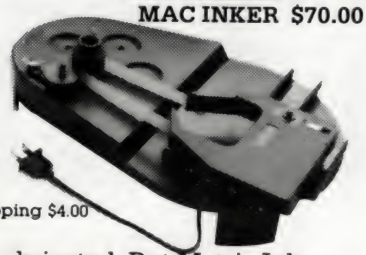

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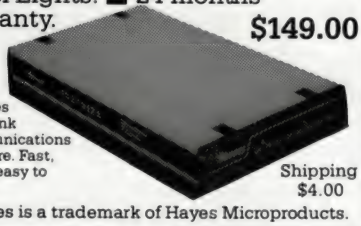

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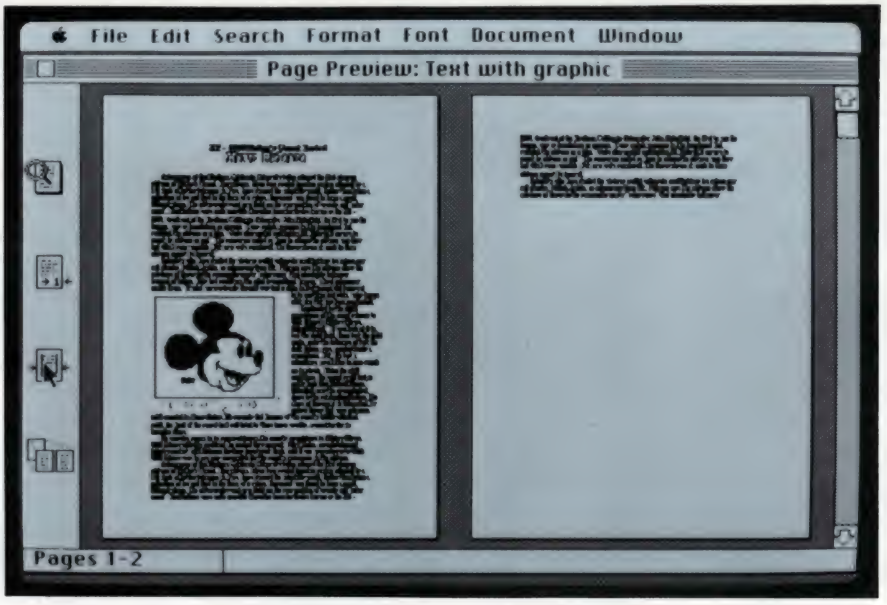
ON THE MAC SCENE
(continued)

which improves the operating speed of many popular programs by 25 to 50 percent, and sells for $595. The multilayer add-on board may also be ordered with the 68881 floating-point coprocessor and access to Microsoft Fortran and SANE for $749. Only the current versions of MacWrite and programs using the sound output, such as music programs, won't operate properly with the 68020 board. Contact: **Novy Systems, Inc., 69 Ravenwood Ct., Ormond Beach, FL 32074, (904) 427-2358.**

FRAME MAC, BEAM MAC II and BEAM MAC are sophisticated yet easy-to-use structural engineering programs created for the Macintosh, Macintosh XL or Macintosh Plus with 512K. FRAME MAC ($595) can analyze any two-dimensional frame or truss, or any beam. BEAM MAC II ($345) can analyze any beam. BEAM MAC ($145) can analyze any simple beam. Contact: **Erez Anzel Software, 113 McCabe Crescent, Thornhill, Toronto, Ontario, Canada L4J 2S6.**

MACINUSE automatically tracks the usage of your Macintosh. It can be installed on any floppy or hard disk and runs silently in the background. Every time an application is used, MACINUSE automatically records the application name, date, start time and duration into a file. If the optional commenting feature is turned on, MACINUSE will prompt you to specify business or personal use and to enter a comment whenever you quit an application, which is added to your file. This allows you to enter a client



MICROSOFT WORD, VERSION 3.0, has upgraded its most commonly used functions like scrolling, saving, and printing so that they are significantly faster. It has a flexible menu system in which short menus list the basic features and one keystroke gives you access to full menus with advanced functions. Menus may be customized to include your most frequently used commands. It supports documents that include text, bit-mapped graphics, object-oriented graphics, formatted numerical tables and equations. It's easy to edit these types of data. Text and graphics may be laid out in multiple snaking columns or side-by-side columns. An outliner not only lets you organize ideas, but when headings are moved, the accompanying text is automatically adjusted. WORD allows you to preview two entire pages exactly as they will be printed. An 80,000-word spelling corrector is included. The program requires 512K and is priced at $395. Contact: **Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073, (206) 882-8080.**

or project name and create records for client billing. The program can operate on all Macintoshes and is priced at $49. Contact: **SoftView, Inc., 4820 Adohr Ln., Suite F, Camarillo, CA 93010, (805) 388-2626.**

MCMAX is a relational database management system for the Macintosh, Macintosh Plus or Macintosh XL with 512K of RAM and a hard disk drive or dual floppy drives. It is dBase compatible: users can develop applications in either MCMAX or dBase III and run them interchangeably on either a Macintosh or an IBM PC. There's no rewriting of programs or reentering of data. Also, MCMAX on the Macintosh is at least four times faster than dBase III Plus on the IBM PC. The price is $295. Contact: **Nantucket Corp., 12555 West Jefferson Blvd., Ste. 300, Los Angeles, CA 90066, (213) 390-7923.**

OVERDRIVE 40 is a 40 megabyte internal SCSI hard disk with an access time of 29 milliseconds that allows for fast program loading. Upon powerup, the drive automatically boots from Apple's 128K ROMs. It comes with four software utilities: an Installer for formatting, testing and partitioning the hard disk into as many as 20 volumes; the Mount Manager desk accessory, which allows you to mount and dismount volumes and specify a default mounting configuration; the FileFinder desk accessory, which aids in the location of files on an HFS volume with deeply nested folders; and a sophisticated backup utility that stores files as standard Mac files. OVERDRIVE 40 is compatible with both HFS and MFS and is priced at $2699. Contact: **Levco, 6160 Lusk Blvd. Suite C-203, San Diego, CA 91212, (619) 457-2011.**

INTERMAIL is a desktop communications system for the Macintosh that offers these features: advanced electronic mail facilities, comprehensive file transfer capabilities, the ability to easily move object or pixel oriented images from one Macintosh to another, a network reminder system, extensive on-line help facilities, and a network management system. In addition, INTERMAIL offers multiple (unlimited) zone support and server-to-server communications, and it has been written to act as an X.400 gateway on the AppleTalk network. It is site licensed, and prices range from $299.95 to $949.95, based on the number of Macintosh network users. A demo disk is available for $10. Contact: **Internet, 20 Amy Circle, Waban, MA 02168, (617) 965-5239.**

OBJECT LOGO is an advanced yet easy-to-use version of the Logo programming language for the Macintosh. It supports object-oriented programming and its advanced features, such as the object systems, have been designed as simple extensions of familiar Logo forms. OBJECT LOGO enhances traditional Logo graphics capabilities with multiple graphics windows, multiple turtles and access to QuickDraw commands. It also incorporates advanced mathematics and features an incremental compiler that automatically generates native 68000 code, an interactive editor and debugger, and full access to the Macintosh Toolbox. The price is $79.95. Contact: **Coral Software, P.O. Box 307, Cambridge, MA 02142, (617) 547-2662.**

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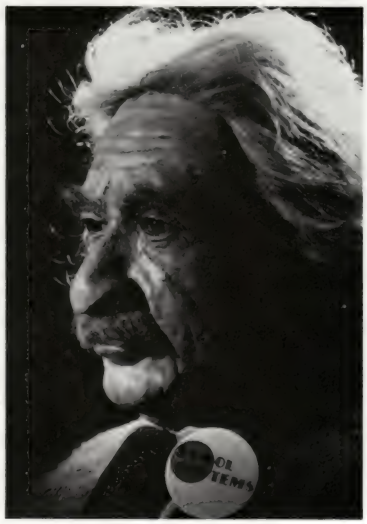

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nibble mac software

Unless otherwise indicated, all programs run under Microsoft BASIC, version 2.0 or higher. You do not need to own Microsoft BASIC to run the MS BASIC programs on these disks. A BASIC run-time package is included on each disk. NOTE: Mac Plus owners should use version 2.1 or higher.

RADION TYRANT is a black box game in which you battle the Radion Guards to escape from the labyrinth. (Nibble V6 #4)

MACINTOSH CURSOR will let you create a new cursor. If you have MS BASIC 2.0, you can incorporate your new cursor into your own programs. (Nibble V6 #4)

Order Reference [RT]. . . $17.95 + shipping

PROGRAMMER'S CALCULATOR will let you calculate in decimal and hexadecimal while it illustrates the use of buttons and edit fields under MS BASIC 2.0. (Nibble V6 #5)

CAPTURE II is a Macintosh version of the ancient Chinese game of Go, complete with Macintosh graphics. Play against the computer or a friend while your Mac keeps score. (Nibble V6 #5)

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MACSPACE straps you into the battle console for a shooting match with the star cruisers of the implacable enemy — the Klaxxon Slime Rulers! Fast-paced Macintosh arcade excitement! (Nibble V6 #6)

PERPETUAL CALENDAR prints a full-page calendar for each month of any year. (MS BASIC 2.0) (Nibble V6 #2)

Order Reference: [CD]. . . $17.95 + shipping

WINDOW DRESSER makes Mac programming easy — it lets you use the mouse to write MS BASIC program code. You can create windows and dialog boxes, complete with edit fields, buttons, and even text. (Nibble V6 #7)

QUICKDRAW DEMOS I accesses the QuickDraw graphics routines that give the Mac its unique look. Demonstration programs display the Cairo font and the special characters in QuickDraw. (Nibble V6 #7)

Order Reference: [QD]. . . $17.95 + shipping

QUICKDRAW DEMOS II is a set of five listings that demonstrate the use of the Mac's QuickDraw routines from within an MS BASIC program. It includes demonstrations of various text modes, character animation, and the range of available text faces. (Nibble V6 #8)

MBASIC BUTTONS shows you how to use button processing for goof-proof user input on the Mac. (Nibble V6 #8)

Order Reference: [DR]. . . $17.95 + shipping

NIBBLE MAC INVESTOR uses powerful graphing and report capabilities to help you assess your investment portfolio. It calculates short-term and long-term gains and losses, as well as broker commissions.

MACGRAPH turns numerical data into sophisticated line graphs, bar graphs or pie charts, complete with labels. You can use MacPaint to add more elaborate graphics.

QUICKDRAW DEMOS III draws patterns and creates rectangles, ovals and rounded rectangles on the Mac.

PATTERN DESIGNER is an easy-to-use editor that lets you custom design patterns, and save them as DATA statements to include in your programs.

AUTOMATIC MENU RESET breaks out of the break command quandary. Using <Command>. during debugging freezes the display of an inactive menu. This routine maintains the output window display until you move the mouse.

PEEKING THE MAC KEYBOARD demonstrates how to use the Option key, Command key and other modifier keys within MS BASIC programs to control input. Sept./Oct. 1985. Order Reference: [VE]. . . $29.95 + shipping

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NIBBLE MAC FILE CABINET is an electronic filing system that features powerful search options, fast data sorting and reports based on search criteria.

AUTOLOG automatically tracks your computer use by tapping into the Mac's clock. Use it to create a record of the time you spend on specific jobs.

MS BASIC TOOLBOX WINDOWS shows you how to use ROM calls from BASIC to change window titles and sizes, erase the close box and more.

STOPWATCH displays the time of day and elapsed time, just like a hand-held stopwatch. It even measures lap times to the nearest tenth of a second and lets you label them.

Nov./Dec. 1985. Order Reference: [CB]. . . $29.95 + shipping. If you have a 128K Mac, you must own the MS BASIC interpreter to use Nibble Mac File Cabinet. It may be used with the run-time package only on 512K (or larger) Macs.

MACBANKER tracks your checking account records with speedy data entry and updating, a variety of printed reports and check macros for monthly bill paying sessions. (Requires a 512K Mac.)

MS BASIC LIST MASTER prints BASIC listings on the Imagewriter with page breaks and your choice of Imagewriter's built-in fonts.

FRACTAL TREES creates realistic trees using fractal imagery.

TCPEEK is a stand-alone application that displays the creator and type for any Macintosh file, so you know which application program created each file. MDS Assembler source code is included.

ZEN AND THE ART OF MACINTOSH PROGRAMMING is a set of two programs. Select All simulates dragging the mouse through an entire file to highlight it. Show Top lets you select a group of MacWrite files from a dialog box and print out the first few lines of each file.

Jan./Feb. 1986. Order Reference: [BK]. . . $29.95 + shipping

ZOOM is a visual database that lets you zoom in on a portion of a map, a picture, or text. Then zoom back for the big picture.

MACBANNER makes banners for every occasion using a variety of fonts, type sizes and type styles.

I CHING tells your fortune using an updated version of the ancient Chinese casting method called I Ching.

MS BASIC TYPE COMMAND lets you scan text files without leaving MS BASIC. A great programming aid!

THE SAMURAI MAC WARRIOR is a font change program that searches for a particular font and/or point size, and changes every occurrence of it to another font and point size.

March/April 1986. Order Reference: [ZM]. . . $29.95 + shipping

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MACSPRINT improves reading comprehension and speed through timed reading drills. A fun learning program for children and adults.

CURSOR EDITOR lets you create custom cursors for use in your own MS BASIC programs.

MS BASIC PROGRAM SHELL gives you the framework for event-driven programs that conform to the Mac user interface guidelines.

May/June 1986. Order Reference: [SP]. . . $29.95 + shipping

NIBBLE MAC MUSICA is a music-making program *extraordinaire!* It lets you save musical creations to disk, edit them, cut-and-paste, and play music at various speeds and in three different timbres per voice. The disk includes four music selections that range from Bach to Elvis Presley.

NIBBLING AT MS BASIC MENUS shows you how to design menus that incorporate Commmand key sequences and various type styles.

QUICKDRAW FROM MACPASCAL is a set of five fun routines that illustrate the various text modes, drawing modes and text faces available from within MacPascal.

BASIC ALERT BOXES creates a professional looking alert box with a default button you choose by pressing Return.

HACKING THE MACINTOSH ROM FROM MS BASIC is a program that demonstrates how to call Toolbox routines to use regions, manipulate text, do advanced calculations on rectangles and manipulate icon resources.

EXCEL CALENDARS prints monthly calendars for any month of any year from now until 1995. Requires Microsoft's Excel.

July/August 1986. Order Reference: [MU]. . . $29.95 + shipping.

SHOPPER MAC quickly and easily stores, updates, sorts and prints shopping lists.

FLAMING FINGERS is a typing drill program that will improve your touch-typing speed and accuracy.

DATA MAKER converts MacPaint pictures to DATA statements you can put into your own BASIC programs. It's graphics programming made very easy!

AIRTIGHT EDIT FIELDS sets up edit fields that accept only numbers, only letters, or both letters and numbers.

EXCEL WORD WRAP is a form letter macro you can add to Excel. Requires Microsoft's Excel.

FIRSTPROGRAM.C sets up a window that displays text and waits for a mouse click. Includes LightspeedC source code.

Sept./Oct. 1986. Order Reference: (SH). . . $29.95 + shipping.

MOVIE CONSTRUCTION KIT is super animation software for the Macintosh. Sophisticated mouse-controlled features let you cut, copy and merge frames into an integrated film. Then view it using the projector feature.

DESIGNER BUTTONS shows how to design customized buttons for your screen displays. Choose a pointing finger, arrow, triangle, playing card, keyhole — or anything you can imagine!

SYSTEMICONS.C demonstrates C language techniques for accessing and displaying some of the common system resources, such as icons and fonts. It also delves into QuickDraw's powerful graphics commands. Includes LightspeedC source code.

Nov./Dec. 1986. Order Reference: [MV]. . . $29.95 + shipping.

MACCALENDAR prints a monthly calendar with plenty of room for notes and graphics.

MACREPEATER challenges you to follow the Mac in a game that tests your memory and concentration. MacRepeater plays a sequence of notes; you try to duplicate them.

SET VOLUME DESK ACCESSORY lets you adjust the Mac's volume, without resorting to the memory-intensive Control Panel.

BASIC KEY CAPS prints out the keyboard location of every character in any font you use.

THINKTANK FILE CONVERTER moves you smoothly from outlining to writing text. It converts ThinkTank outline files so they can be fleshed out on any Macintosh word processor.

EXCEL MAILING LIST sets up an addressing database using Excel.

EXCEL DISTRIBUTION MACRO plots the frequency distribution of test scores or any other set of data.

NO3.C is a standalone graphics drawing program that demonstrates event handling in C. (LightspeedC source code included.)

Jan./Feb. 1987. Order Reference: [MC]. . . $29.95 (Introductory price $19.95 expires 4/30/87) + shipping

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The disks below are listed according to the first program on the disk. Each disk contains multiple programs; see the complete descriptions above.

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DR ☐ **QuickDraw Demos II**
Nibble V6/#8. **$17.95**

VE ☐ **Nibble Mac Investor**
Sept./Oct. 1985. **$29.95**

CB ☐ **Nibble Mac File Cabinet**
Nov./Dec. 1985. **$29.95**

BK ☐ **MacBanker**
Jan./Feb. 1986. **$29.95**

ZM ☐ **Zoom**
March/April 1986. **$29.95**

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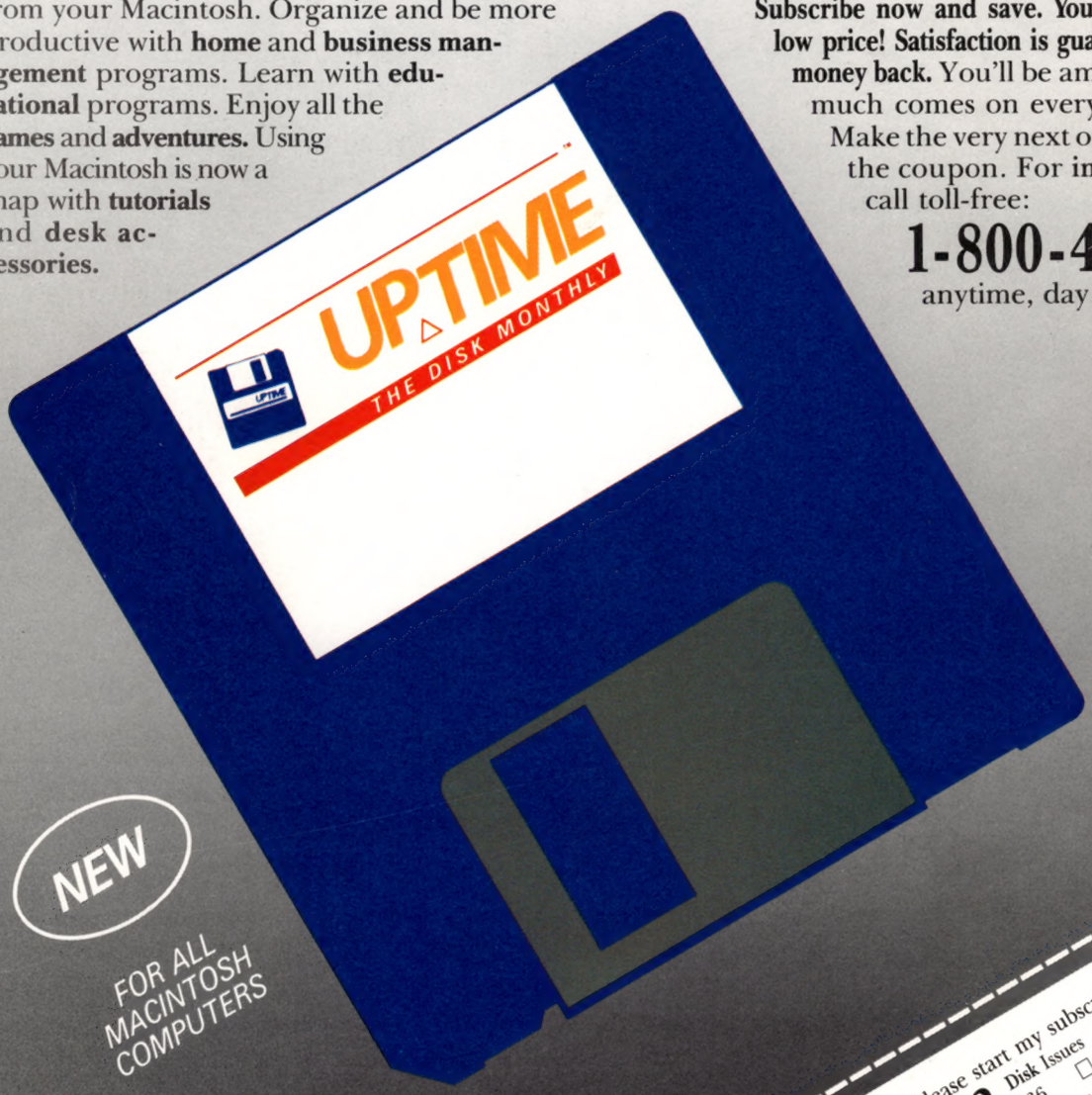

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